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COMPUTERWORLD

Systempro wins user respect

BY RICHARD PASTORE
CW STAFF

It's a miniature minicomputer! It's a mighty PC! It'll change the face of computing!

That was some of the ballyhoo that surrounded the introduction of Compaq Computer Corp.'s Systempro one year ago. The hype was met with gibes at the machine's sales, positioning and design. But users and analysts now say the Systempro has succeeded as a premier file server and is leading a new wave of personal computing.

Despite software delays and a sputtering start, the Systempro seems to be winning a place in the high-end file-server market. "Earlier in the year, the technology was new, and people were staying away from it. Now, I see sales picking up," said Frank Michnoff, an analyst at Meta Group, Inc. in Westport, Conn.

It is also attracting a flood of competitors, notably IBM Personal System/2 servers announced last week (see story page 152) and systems from NCR Corp., Digital Equipment Corp. and a variety of PC clone vendors.

Problems surfaced for Compaq immediately after the Systempro's introduction in November 1989. Development delays in multiprocessor versions of Microsoft Corp.'s LAN Manager and Novell, Inc.'s Netware put a crimp in Compaq's plans.

"We had hoped all of the

Continued on page 152

System profile

Compaq Systempro sales have been up and down in 1990

	Number of units
January	96
February	420
March	738
April	491
May	798
June	993
July	443
August	555
Eight-month total	4,534

Source: Storeboard, Inc

Outsourcing threat spurs court battle

BY CLINTON WILDER
CW STAFF

NASHVILLE — Most information systems staffs are probably opposed to outsourcing, but one IS staff is actively challenging it in a county court here.

Employees at the Nashville Electric Service filed a lawsuit last week seeking to prevent the utility from outsourcing its IS functions to a Memphis-based computer services vendor. The Nashville Electric Service Employees Association, which represents 29 of the agency's 43 IS staff members, claims that transferring them to the vendor's employment would violate city charter stipulations that job transfers be based on seniority and performance.

Nashville Electric, a quasi-public agency responsible for electric power in Nashville and the surrounding county, has announced its intention to sign a seven-year contract with

Continued on page 151

Special Report: Imaging systems

Platform preferences

On which platforms are you running or would you be most likely to run image processing applications?

Base 291 (multiple responses allowed)	Percent of respondents
Midrange	40.5%
PC LAN with PC or mini-server	33%
Mainframe	29.6%
Stand-alone PC	27.8%
PC LAN with mini-server linked to mainframe	26.5%
Other	2.1%

Source: Computerworld survey

Imaging *may be an answer to the prayers of both paper-choked companies and mini makers (see chart). Learn how the technology works and how more than 300 IS managers view it. Page 65.*

IBM on object-oriented path

BY ROSEMARY HAMILTON
CW STAFF

IBM will adapt AD/Cycle, its strategic application development architecture, to an object-oriented programming environment and will show the initial results of this in the first half of 1991, a company executive said last week.

The plans for AD/Cycle are one aspect of a major effort under way at IBM to move to object-oriented technology. In an interview last week, Cliff Reeves, manager of Common User Access architecture at IBM's Carey, N.C., laboratory, said the company will also enhance its relational database management systems to accommodate this technology and will use it extensively for its own internal development.

"We've got internal and external pressures about object-oriented technology," Reeves said. "So it was inevitable that we would come to it."

The AD/Cycle project will likely take years to complete, Reeves said. He did not provide a time frame for the relational DBMSs. But analysts, along with IBM, said it will take at least two or three years before object-oriented technology gains widespread use in mainstream information systems shops.

"The cultural changes to

Continued on page 6

NEWSPAPER

OS/2 trimmed down in hopes of a better fit

BY PATRICIA KEEFE
CW STAFF

NEW YORK — True to its word and despite a qualified endorsement from co-developer Microsoft Corp., IBM rolled out OS/2 Standard Edition Version 1.3 last week, a 2M-byte release said to offer substantial improvements in performance, quality and printer support. So far, however, user reaction has been restrained.

IBM also unwrapped OS/2 Extended Edition 1.3 and OS/2 LAN Server 1.3 (see story page 153) and multimedia enhancements said to allow users of IBM's Audio Visual Connection software to create full-motion video presentations on an IBM Personal System/2.

Typically, users looking to boost the power of Intel Corp. 80286-based personal computers are the most enthusiastic about OS/2 1.3. Other users tended to agree with Microsoft Chairman Bill Gates, who said last week that OS/2 1.3 was "not a significant upgrade" but rather "just an improvement."

Still others, such as Mike Drips, PC guru at U.S. Sprint Communications Co.'s information systems department, said most users are more interested in the soon-to-come 32-bit OS/2 2.0 and portable OS/2 3.0. "I don't think users will flock to OS/2 because of 1.3's reduced memory requirements," he said.

Drips estimated there are only about a dozen mainstream OS/2 applications. "The number of products under OS/2 compared to Windows is [still] minuscule," he said.

Continued on page 153

TKO for programmer OT

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Amid the hoopla over the federal budget, the U.S. Congress approved a little-noticed provision that will eliminate overtime pay for some computer programmers.

Tucked away in a minor bill on American Samoa labor rules was a section exempting many non-salaried programmers from overtime pay provisions of federal labor laws. It was passed Oct. 27 as Congress scurried to push through a flurry of last-minute bills, including several that benefit the computer industry (see story page 151).

No hearings were ever held on the bill, which was supported by the National Association of Computer Consultant Businesses and Adapso.

The bill affects "computer systems analysts, computer programmers, software engineers" and other computer professionals who earn $25 per hour or more, on the grounds that these highly paid workers do not need federal protection.

Supporters of the bill claimed it benefits the workers.

Most companies consider 150% overtime pay to be prohibitive for employees earning $40 or $50 per hour, so they either forbid overtime work or convert the employee to a salary with limited overtime pay, said Harvey Shulman, general counsel for the NACCB. These employees will now be able to work extra hours and get paid their regular hourly rates, he said. •

INSIDE

Windows 3.0 wows users, but reviewers have some reservations. For summary of results from leading PC labs and expert opinions, see the premiere of Technology Analysis. Page 38.

IBM, DEC workstations lead Unix Expo product parade. Page 12.

Global computer security group being formed to coordinate international response to hackers, viruses. Page 4.

DEC set to link competing VAX databases. Page 6.

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Quotable

"DEC's whole direction promises great things in the future, but the key word is promises."

LAWRENCE CARDARELLI
R.W. JOHNSON
PHARMACEUTICAL

On DEC's links to other research institutes' databases. See story page 6.

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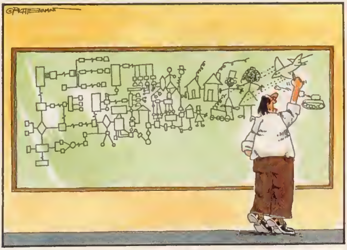

EXECUTIVE BRIEFING

■ **A controversy over outsourcing has moved from the boardroom to the courtroom** in Nashville. Employees at the city's quasi-public electric utility have sued the utility's board to prevent its intended outsourcing of information systems to a Memphis-based services firm. Although the vendor plans to hire the 43 IS employees, the suit claims they should be free to apply for non-IS municipal jobs and are unfairly losing seniority status. **Page 1.**

■ **Image processing technology is producing big benefits** in both time and space savings for early adopters — but those benefits don't come without effort and expense. Document conversion and indexing can be costly and lengthy. Many users say they worry that today's imaging technology won't be adaptable to future broader-based applications. Still, companies that have taken the first step are loud in their praises, and many organizations are poised on the brink of investment. **Special Report, page 65.**

■ **IBM's AD/Cycle will be an object-oriented programming environment,** an IBM official confirmed. Although the full adaptation to object-oriented methods will reportedly take years to complete, IBM is expected to showcase its initial results sometime in the first half of 1991. **Page 1.**

■ **Hourly wage computer programmers will be exempt from overtime pay,** according to an obscure regulation passed by Congress last week. The exemption, which will be applicable to technicians who make at least $25 per hour, was supported by the software, services and consulting industries. **Page 1.**

■ **The venerable Series/1 minicomputer** will no longer be sold by IBM, although support will continue for at least five years. The announcement, which was made to members of Common, the IBM midrange user group, was attributed to the success of the RISC System/6000. **Page 153.**

■ **IS executives said they perceive a "leadership gap"** in their companies on key IS issues, according to an Andersen Consulting survey. On nearly a dozen issues that IS executives said they consider to be important, they rated their organizations as not doing an effective job. **Page 57.**

■ **IBM rolled out both its new version of OS/2 and its long-awaited Personal System/2** file servers. The servers will mean new competition for the Compaq Systempro, which has had a sometimes rocky but generally successful year on the market. At least one user, Gibson Greetings in Cincinnati, has opted for the PS/2 instead now that it is available. **Pages 1 and 152.**

■ **Rapid growth in the biotechnology industry** isn't translating into more jobs for IS professionals. Biotech companies are still concentrating on research rather than on the production and customer service areas that drive the need for systems. **Page 135.**

■ **Training isn't just for trainers** anymore. Managers are being asked for more input to ensure that the best training is being delivered to the right people at the right time. **Page 147.**

■ **On-site this week:** In Moffett Field, Calif., NASA's test bed for emerging technologies is attempting to rewrite its aerodynamic simulation software every three years using Silicon Graphics' workstations. **Page 37.** Systems revamps are also taking place at the Fort Wayne, Ind.-based General Motors truck and bus assembly line, where Electronic Data Systems has recently installed a problem tracking system and inspection feedback application as part of General Motors' quality assurance program. **Page 29.**

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Lotus scoops Samna for $65M

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. paid dearly to get its foot in the door of the emerging Windows word processing market, coughing up $65 million under a definitive agreement to acquire struggling Atlanta-based Samna Corp.

While across the country in Redmond, Wash., Microsoft Corp. was celebrating the first anniversary of Word for Windows, Lotus Chairman and Chief Executive Officer Jim Manzi left no doubt he plans an "extremely aggressive" run at the Windows word processing market.

The deal is expected to be completed by year's end. Estimates that it will cost Lotus more than four times Samna's revenue run rate have raised eyebrows. Samna posted a net income of $145,000 for the quarter ended Sept. 30 and has suffered a loss of $1.2 million for the nine months ended Sept. 30.

Samna, producer of Ami word processing products, has a relatively small share of the personal computer word processing market (see chart) but has reportedly captured 15% to 20% of the market for Windows word processing applications.

Buying in

The acquisition of Samna will give Lotus a tiny foothold in the PC word processing market

	1989 worldwide shipments	Percent of '89 worldwide market share by shipments
Wordperfect	1,400,000	39.8%
Microsoft Word	500,000	14.2%
Wordstar 5.0 and 5.5	345,000	9.8%
IBM Display Write 4	300,000	8.5%
Software Publishing Professional Write	250,000	7.1%
Ashton-Tate Multimate	200,000	5.7%
Samna Word4, Ami	47,000	1.3%
Other		13.6%

Source: International Data Corp.

CW Chart: Doreen St. John

The acquisition caught the industry off guard in more ways than one. Some had expected Lotus to purchase database vendor Sybase, Inc., in which it holds a 17% stake; additionally, Lotus has had a tight relationship with Wordperfect Corp.

Lotus and Wordperfect have shared technology and have promised to align their user interfaces and improve interoperability between their products.

Wordperfect Vice-President W. E. Pete Petersen said Wordperfect is not for sale. "Lotus may have wanted a date, but they never came out and asked us," he said, adding that the two firms have never seriously considered merging. While Manzi expects to compete with Wordperfect, Petersen said, "I'll save my paranoia for Microsoft."

Last spring, Lotus scrapped a merger attempt via a stock swap with Novell, Inc., after being frustrated by demands for equal board representation.

This time around, Lotus went for the straight cash deal. This could create a loss in the fourth quarter, which was expected to show improvement over the last two disappointing quarters, but Wall Street seems unconcerned.

Samna became a wholly owned subsidiary and received no seats on the board. It will continue to operate in Georgia, but its logo will be replaced by Lotus'. Samna President Said Mohammadioun will report to Frank King, Lotus' senior vice-president of business group software.

What Lotus gets for its investment is an already shipping addition to a planned suite of Windows products, a shot at grabbing share in the second generation of the word processing market and ammunition to toss at critics who complain Lotus is too reliant on one product.

"We stacked up the purchase price against the size of the business opportunity, which is to participate as a major player in what will be, in the not-too-distant future, a billion-dollar market," said Robert Schechter, Lotus' vice-president of finance.

CERTs unite to combat viruses, deter hackers

BY MICHAEL ALEXANDER
CW STAFF

GAITHERSBURG, Md. — A group of about 11 organizations plans to announce the formation of a Computer Emergency Response Team (CERT) with an international flavor next week.

CERTs have sprung up around the world in recent years to cope with computer viruses, develop and distribute software patches for security loopholes and collaborate on other computer security-related issues. The new group, which is to be called CERT System, would coordinate the activities of the individual CERTs during computer-related emergencies with international scope.

The charter members consist of government agencies, research laboratories and vendors, both here and abroad, including CERTs at Carnegie Mellon University and in France, Canada and Australia, as well as at NASA, Lawrence Livermore Laboratories and IBM, among other vendors.

The notion of an international CERT arose during an emergency meeting convened to combat the "No Nukes" worm that wriggled its way into the Space Physics Analysis Network (SPAN) operated by NASA in October 1989, said Ron Tencati, SPAN security manager. Security experts suspect that the worm was launched from France and entered NASA's network and the Decnet Internet via the European E-SPAN.

Helping to combat this and other forms of high-tech tampering that crosses international boundaries will be one of the missions of CERT System, Tencati said. "Trying to prosecute a hacker in a remote country is almost impossible," he said. Many countries do not have clear laws prohibiting illegal computer entry, and law enforcement authorities here and abroad are reluctant to become embroiled in what amounts to an "international incident" to arrest a lone hacker, Tencati said.

"The hackers are untouchable, and they know that," Tencati added.

The organization will be sponsored by the National Institute of Standards and Technology (NIST) and is headquartered here, at least for now, Tencati said. The headquarters is expected to move every two years with the election of a secretary, who will be charged with overseeing CERT System activities. The first secretary will probably be Dennis Steinauer, manager of computer security management and evaluation at NIST, Tencati said.

Steinauer did not return calls seeking comment.

CERT System will in some ways be patterned after the CERT at Carnegie Mellon's Software Engineering Institute. This CERT, which is funded by the Department of Defense, was set up in November 1988 following the infamous worm attack that crippled thousands of computers on the Internet.

Even then, it was apparent that several CERTs would be needed, said Richard Pethia, CERT coordinator at Carnegie Mellon's SEI. "There are different communities of computing, and each has a unique set of cultures, policies, procedures," Pethia said. "To have a single organization responsible to all of these computing communities did not make sense."

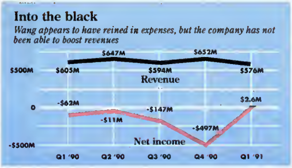
CORRECTION

Computer Professionals for Social Responsibility decided just before press time for the Oct. 29 issue that it would not consider layoffs despite difficult budget times.

Maximum Strategy Corp. in San Jose, Calif., was incorrectly referred to in the Oct. 15 issue as Maximum Strategies Corp.

The chart on page 6 [CW, Oct. 22] was incorrectly labeled. Under accounting software, it should read Computer Associates 9.6%, Oracle 2.8% and Ross Systems 2.3%.

The chart accompanying a story on Wang Laboratories, Inc.'s first-quarter profits [CW, Oct. 29] did not include the firm's first-quarter results, and the caption failed to reflect that Wang had posted a profit. The correct version is printed below.



Into the black

Wang appears to have reined in expenses, but the company has not been able to boost revenues

Source: Wang Laboratories, Inc.

CW Chart: Tom Monahan

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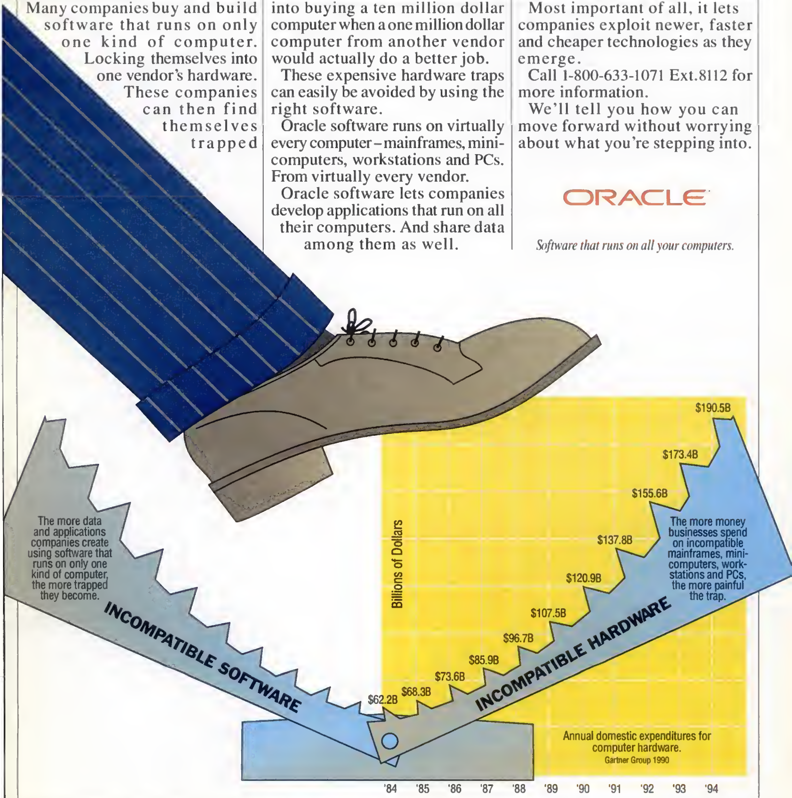

The more data and applications companies create using software that runs on only one kind of computer, the more trapped they become.

The more money businesses spend on incompatible mainframes, minicomputers, workstations and PCs, the more painful the trap.

Annual domestic expenditures for computer hardware.
Gartner Group 1990

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DEC rains on Oracle's parade

BY MARYFRAN JOHNSON
CW STAFF

BOSTON — Digital Equipment Corp. hopes to blow away the clouds hanging over its own RDB/VMS relational database management software today and rain on Oracle Systems Corp.'s parade. Archrival IBM may notice a few sprinkles as well.

DEC is expected to announce new tools and expanded functions for RDB, among them the capability for users to transparently access both Oracle's RDBMS and flat files under DEC's own RMS file management system. The company is also expected to spell out — for the first time — its long-term database plans.

DEC officials last week confirmed the details of a massive strategic push to enable users to interoperate among third-party databases — a direction that industry analysts said gives the Maynard, Mass.-based vendor a notable jump on IBM.

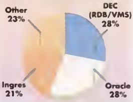
"This announcement is an important move for DEC in supporting a connection between different databases — not just separate [DEC databases] but ones from different vendors," said Bob Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco. "That certainly is a very important step in that direction and one where DEC is way ahead of IBM."

DEC's plan hinges on several alliances with third-party database tool vendors and systems integrators.

Third-party vendor Smartstar Corp. confirmed last week that it will announce data conversion and migration tools for users "looking for the road out of Oracle and into RDB," a spokesman said. Additional database conversion tools will be announced by Sunnyvale, Calif.-based Trifox, which converts applications written in Oracle's SQL Forms and SQL RPT to its own RDB-compatible tool set.

Close relations

DEC and Oracle carve up the lion's share of the VAX relational DBMS market



Source: Computer Intelligence

Next month, DEC will release an object-oriented application development environment called Trellis, used in-house at DEC since 1985 for constructing complex database applications on VMS and Ultrix, DEC's own version of Unix. For RDB users who want to integrate object-oriented technology, DEC will also provide Objectivity/DB for VMS and Ultrix.

Objectivity/DB on the DEC platform is the result of an alliance announced in August between DEC and Objectivity, Inc. in Menlo Park, Calif. The object-oriented database is already popular on Sun Microsystems, Inc. workstations.

"DEC's whole direction promises great things in the future, but the key word is promises," said Lawrence Cardarelli, an information specialist at R.W. Johnson Pharmaceutical Research Institute in Raritan, N.J., the clinical research arm of the Johnson & Johnson operating companies.

Cardarelli, who had been briefed on the software announcements, said he was impressed with the scope and capabilities of the products. R.W. Johnson is standardized on Oracle's RDBMS, but developers there would like to interoperate among other DBMSs in use throughout the firm, he said.

"We would like transparent access to numerous sites and the ability to optimize our databases and minimize traffic on the network," Cardarelli explained.

As part of its Network Applications Support (NAS) services, DEC is expected to introduce an "information network" that integrates database capability such as SQL into NAS. Analysts said that will enable users to create distributable applications for multivendor environments.

IBM has been tackling distributed databases for years and now provides some capabilities to allow mainframe databases to talk. That function is limited, however, in that one DB2 database can communicate with another DB2 database but not with other IBM relational systems.

"DEC's longtime strategy for distributed RDB is pretty exciting, but you can't buy it yet," said Bill Wood, assistant director of scientific computing at Smithkline Beecham Corp. in Philadelphia.

"Being able to migrate applications away from Oracle could provide users with a lot of flexibility, especially in pricing," Wood added. "If you want to stay with Oracle, you can apply a lot of pressure."

IBM

CONTINUED FROM PAGE 1

adopt this approach will be of an enormous magnitude," said Greg Boone, president of Case Research, Inc. "Computer-aided software engineering is what a lot of people are doing now, and they are having trouble with it. [Object-oriented programming] is just an enormous, enormous shift from that."

While IBM has announced development agreements with object-oriented language companies in recent weeks, it has yet to publicly spell out its plans for this technology, which has become one of the hottest software topics of the year.

"We've wanted them to part the kimono a bit more on this so we can understand where they are headed," said David Moore, a senior vice-president at Mellon Bank in Pittsburgh.

Object-oriented programming (OOP) is radically different from today's software development procedures. It also provides a key benefit of reusable code, which cuts down on both development and maintenance time (see story below).

According to Reeves, the company has several object-oriented efforts under way. For starters, IBM is becoming a big user of OOP, Reeves said. He confirmed that IBM in Denmark used Smalltalk to develop its own version of Officevision. U.S. developers of Officevision have also "done a great deal of work" with Smalltalk, Reeves said.

Versions of Smalltalk, which was originally developed at Xerox Corp. in the 1970s, are marketed by at least two companies, including Parcplace Systems and Digitalk, Inc., both of which recently inked licensing and development agreements with IBM.

"The technology will be used all over IBM," Reeves said. "Not as a policy, but because it is so useful."

Meeting the goal

Perhaps most challenging will be the goal for AD/Cycle. As this architecture is outlined today, it provides increased productivity for traditional programming languages. A move to object-oriented methods, therefore, will require extensions and changes across virtually all of AD/Cycle's components, including the key piece: its information model.

Reeves said IBM will take on the easiest aspect of this task first by announcing support of object-oriented languages, beginning with Smalltalk, in the first half of 1991. Today, AD/Cycle is designed to support the Systems Application Architecture languages, such as Cobol.

"It is safe to assume that one of the first things we will do is introduce OOP within AD/Cycle," Reeves said. "The first thing will be the languages, and of course, Smalltalk will be one."

Starting next year, IBM will take on the far more difficult job of adopting object-oriented approaches and methods for AD/Cycle. Reeves said IBM will extend the Repository Manager Information Model, which currently uses an entity-relationship approach of representing data, to accommodate objects. IBM will simultaneously be working with its AD/Cycle business partners to expand the design and modeling tools into the object-oriented world, Reeves said.

"I don't believe the current AD/Cycle technology is directed only at procedural languages," he said. "If the methodologies were adjusted, the benefits of OOP could move across the life cycle. That's exactly our approach."

In the meantime, IBM said it intends to bring object-oriented capabilities to existing RDBMSs, although no time frame was provided. Reeves said IBM has not ruled out developing a new object-oriented DBMS but will work with this add-on approach in the near term.

Wait 'n' see

While some IS executives contacted last week said they are in a wait-and-see mode when it comes to object-oriented technology, one IS shop is running a customer information system built with object-oriented concepts.

Earlier this year, The Brooklyn Union Gas Co. went live with its Customer-Related Information System, which was written in PL/1 but uses object-oriented techniques, according to William Feraudo, vice-president of IS. Feraudo said the company had no choice but to apply object-oriented techniques to PL/1, because there is no mainframe-based object-oriented language.

The system, which took 2½ years to build, runs on an IBM 3090 and is made up of 900,000 lines of code. It replaced an outdated system consisting of 1.5 million lines of code, Feraudo said.

He said the major benefit so far is the ease with which modifications can be made to the system. "We're down from 200 people who built the system to 12 people maintaining it," he said.

Object orientation brings a new dimension into play

For many of today's programmers, a move to OOP would be stepping into a new dimension.

OOP requires a programmer to isolate data and related processes. Together, they make up a single object. Programs become a collection of objects that swap messages between one another to trigger events.

"With traditional languages, the sequence of events is driven by the program," said Jeff Tash, president of Database Decisions in Newton, Mass. "The user reacts to the program. With object-oriented programs, it is controlled by the user."

A key benefit is the reusability of objects. Once one is created and accepted, a programmer would have an error-free capsule of code that can be reused. Not only would that reduce development time, but it would also cut down on maintenance.

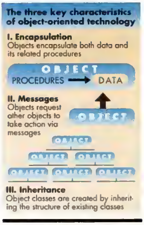
While OOP is hardly new — it was created at Xerox Corp. in the 1970s — it has remained on the outer edges of information systems until recently. Increasingly, it is catching the attention of mainstream IS executives, many of whom are overseeing task forces or pilot projects.

OOP has been endorsed by major vendors, and it is well suited for programming graphical user interfaces.

ROSEMARY HAMILTON

The object of the game

Object-oriented programming relies on utilizing reusable data objects for new but related definitions


The three key characteristics of object-oriented technology
I. Encapsulation
Objects encapsulate both data and its related procedures
OBJECT
PROCEDURES
DATA
II. Messages
Objects request other objects to take action via messages
OBJECT
OBJECT
OBJECT
OBJECT
OBJECT
OBJECT
OBJECT
III. Inheritance
Object classes are created by inheriting the structure of existing classes

Source: Forrester Research, Inc.
CW Chart: Doreen St. John

DEC stands behind long-term strategy; no ‘layoffs’ planned

BY NELL MARGOLIS
CW STAFF

BOSTON — The nation’s recession and the company’s battered stock notwithstanding, Digital Equipment Corp. plans no layoffs, DEC President Kenneth H. Olsen told stockholders at the firm’s annual meeting last week.

However, as he made clear in answers to persistent questions from the floor, we can expect to see DEC try any measure short of “old-fashioned, pink-slip-and-out-the-door layoffs” in its attempts to compromise between its staunch tradition of humane treatment of employees and the dire need to reduce expenses.

“We never say that we’ll keep the same people forever, whether we need them or not,” Olsen said. “We try to avoid layoffs — but we always make adjustments.”

Olsen conceded that precarious economic conditions across the U.S. and particularly in the company’s headquarters state of Massachusetts are undercutting the effectiveness of DEC’s voluntary retirement and attrition strategy. Moreover, he added, “We never have said we won’t have layoffs, just that we want to avoid them. Never say never about anything.”

Stand their ground

Throughout his address to shareholders, many of whom have seen their investments in DEC trounced during the past four difficult quarters, Olsen repeatedly emphasized long-term strategy rather than short-term reaction to market swings as the key to DEC’s strength. “These strategies are what make this company what it is, and we won’t back down,” Olsen said.

Among the long-term strategies to which DEC will adhere, he said, are the following:

- An increased emphasis on — and autonomy for — the targeted business units into which the firm has been divided.
- A more aggressive assault on computer leasing, including possible use of some of DEC’s rich cash reserves for lease financing.
- An implacable resolve not to shrink the breadth of DEC’s hardware or software product lines or diminish its zeal for alliances in the face of financial pressure.

However, the company does plan to break with one recent tradition: “When the good times come back around,” he said, “we will declare a dividend.”

Exec egress hits Ingres

BY JEAN S. BOZMAN
CW STAFF

ALAMEDA, Calif. — A raft of top executives is leaving Ingres Corp. just days before an anticipated 200-person layoff at the 1,200-person firm, which was acquired on Oct. 22 by Ask Computer Systems, Inc. in Mountain View, Calif. The executives were all involved in product planning — the type of personnel Ask executives had said would be staying on.

Ed Horst, director of product management, who had been at Ingres for more than five years, is leaving to become director of product marketing at Servio Corp., an object-oriented database firm also in Alameda. Horst will join Paul Butterworth, Ingres’ chief scientist, who left Ingres Oct. 5 to become Servio’s vice-president of engineering. Mitch Bishop, director of Ingres’ Open Systems Products Group, also resigned last week. Bishop will be director of marketing at nearby Wind River Systems, Inc. in Alameda.

More changes

As expected, Ingres President and Chief Executive Officer Paul Newton also left Ingres last week. However, Newton had publicly stated that he would only remain with the firm until the acquisition by Ask was complete [CW, Sept. 17]. William Smartt, Ingres’ chief financial officer, also left last week.

Ask CEO Sandra Kurtzig said she had hoped to retain most Ingres engineers and technologists. “I have often said that a software company’s assets come in the building every morning and walk out the door at night,” Kurtzig said at a press conference Oct. 26. “Our human resources department is trying to put together a reduction-in-force package that is viewed as positive by the employees [who] stay. We are very interested in the Ingres technology and in moving it forward.”

Across San Francisco Bay at Ask/Ingres competitor Oracle Systems Corp., two top executives are also leaving their jobs. Brian Owens, vice-president of Oracle’s minicomputer marketing group, has resigned and will take a senior management position at Legent Corp.

And, in a surprise move, Chris Greendale, vice-president of the Oracle USA Sales Division, was terminated. The company said Greendale’s termination was part of a continuing consolidation.

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				55.81%	60	5296	39722	22.94%
				60.48%	90	4199	28558	16.49%

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NEWS SHORTS

Wang introduces Unix boxes

Wang Laboratories, Inc. unveiled two Unix-based, entry-level multiuser microcomputers last week. The 16-user DX100 and 32-user DX200 are the company's first micros to be preconfigured specifically for the Unix community and are priced at $8,995 and $10,995, respectively.

....

Ask stockholder bid rejected

Ask Computer, Inc. repelled a proxy fight by independent investor James Lennane last week, announcing that a tally of shareholder votes had denied Lennane a seat on the board of directors. Lennane, who owns roughly 7% of all Ask stock, had protested the Ask board's tender offer for Ingres Corp., which was made without shareholder approval [CW, Oct. 29].

....

Turbo Pascal upgrade due

Borland International will announce today the latest version of its popular Pascal programming language, Turbo Pascal. Turbo Pascal Version 6.0 is an object-oriented language and will sport several new features, including Turbo Vision, an application framework that allows programmers to start from a generic application that includes support for overlapping windows, pull-down windows and the handling of the mouse. The enhanced system will also include a spruced-up development environment.

....

The word on Word

Microsoft Corp. will continue to shift its leading character-based applications to a more intuitive and visually appealing setting today with the introduction of Word Version 5.5 for DOS systems, the latest version of its popular word processing application. The updated application will adopt many of the graphical interface features found in Microsoft Windows, OS/2 and Apple Computer, Inc. Macintosh environments, according to company officials. For example, several features that could previously be accessed solely from the keyboard can now be accessed by pull-down menus and pop-up dialog boxes.

....

OMG lands Apple

Apple Computer, Inc. last week became the newest member of the Object Management Group (OMG), a trade association intended to promote standards for object-oriented technology. With the latest addition, the OMG has been endorsed by nearly every major systems and software company, with the notable exceptions of IBM and Microsoft Corp., said John Slitz, the group's vice-president of marketing. Also last week, the group issued a request for proposals for object request broker technology. An object request broker is a key element in object-oriented programs because it functions as the primary message vehicle between objects.

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Unisys forms software group

Unisys Corp. formally announced its software subsidiary last week during Unix Expo, which was held in New York. The wholly owned subsidiary, called Ally Software, Inc., was hinted at by Unisys last summer. However, the formal name and incorporation were not announced until last week. Ally Software, which is based at the parent company's Blue Bell, Pa., headquarters, has some 59 employees, 21 in sales and marketing and 38 in engineering. All were drafted from Unisys, Ally President Richard C. Goyette said.

....

AST 486 breaks $4,000 barrier

AST Research, Inc. released a small-footprint Intel Corp. I486-based microcomputer last week that sells for less than $4,000. The AST Bravo 486/25 is based around the Industry Standard Architecture bus, comes with 2M bytes of memory and has a footprint of 15.5 in. by 16 in. It comes in two models without a hard drive that retail for $3,995 each and one with an 80M-byte hard drive for $4,725.

More news shorts on page 151

Unisys users concerned, not panicked

BY ELLIS BOOKER
CW STAFF

NASHVILLE — Just days after Unisys Corp. reported worse-than-expected financial results that sent its stock sliding to an all-time low, customers of the nation's No. 3 computer company expressed concern but little panic about their vendor's recent drubbing on Wall Street.

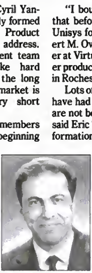
Users and Unisys executives at the Cube, Inc. meeting last week rallied behind the beleaguered firm, saying its technology and support were still good and claiming its recent financial woes had been overplayed in the press and in the financial markets.

Two weeks ago, Unisys reported a $356.8 million loss for the period, including a $181 million charge to reduce its 75,000 person work force by 5,000 by the middle of next year [CW, Oct. 29]. Late last week, Unisys stock closed at 2⅝.

Unisys officials last week stepped up damage control at the four-day meeting and vendor fair, which attracted more than 1,600 people, nipping in the bud analyst speculation that the company was headed for a Chapter 11 reorganization or a Chapter 7 bankruptcy.

"I believe we are more than halfway though the transformation of Unisys," said Cyril Yansouni, head of the newly formed Computer Systems Product Group, in his keynote address. He said the management team had decided to make hard choices and focus on the long term, "but the stock market is focusing on the very short term."

A number of Cube members picked up this theme, beginning with current Cube President and Softchec, Inc. Executive Vice-President Dean Sutton, who urged the audience to promote and support their vendor. Cube is the largest of the two domestic Unisys user groups; the other, Use, Inc., claims about 650 organizational members.



Unisya' Yansouni
looks to long term

"The recent panic on Wall Street is ludicrous, truly ludicrous," Sutton said in his keynote address. Illustrating Cube's confidence in the company, Sutton reported that the organization had recently acquired Unisys stock — "at an unbeatable price." Indeed, several individuals at Cube last week said they had bought Unisys common stock, which was trading late last week at 2⅜.

"I bought some. I never did that before, and I've dealt with Unisys for 15 years," said Robert M. Owsinski, general manager at Virtual Soft, Inc., a computer products and service company in Rochester Hills, Mich.

Lots of technology companies have had a bad year, "[but] they are not being painted similarly," said Eric Thomas, director of information systems and services at John C. Lincoln Hospital and Health Center in Phoenix. "This is still a $9 billion to $10 billion company," he added. "You can't lose sight of that."

Unisys is not experiencing a liquidity shortage, said Yansouni, referring to the $1.25 billion in revolving credit that Unisys has access to until January 1993.

For other Cube attendees, however, Unisys's recent financial troubles have reopened old complaints dating back to 1986, when Unisys was formed in the complex merger of Sperry Corp. and Burroughs Corp.

"I hated to see the merger. It was like mixing apples and oranges," said an IS executive at a Pennsylvania utility, who asked not to be named.

IBM pays up on patent

BY NELL MARGOLIS
CW STAFF

BOCA RATON, Fla. — IBM last week agreed to pay royalties to Rodime PLC, settling a three-year charge that it had trampled on the struggling Scottish manufacturer's 3½-in. disk drive technology rights.

For IBM and Rodime, the settlement and subsequent cross-licensing agreements put an end to expensive legal skirmishing. For other firms in the 3½-in. drive market, however, it means that the season of lawyers and licenses is just about to begin. For users, analysts said, it is likely to mean a price hike for 3½-in. drives.

"We definitely plan to pursue a licensing program with the rest of the 3½-in. industry," said Rodime Chief Financial Officer Jay Swent. A suit against 3½-in. market leader Conner Peripherals, Inc., which had been stayed pending the outcome of the IBM case, will return to the front burner, Swent said.

Terms of the IBM/Rodime accord were not released. However, John Altmiller, an attorney at the intellectual property law firm of Kenyon & Kenyon, which represented the Scottish contender, said that "the majority of 3½-in. drives on the market today do infringe claims of the Rodime patents."

The list of firms likely to get the first invitations to negotiate with Rodime include Conner, Quantum, Inc. and Maxtor Corp.

Harvey Allison, an analyst at Alex. Brown & Sons, Inc., indicated that the successful challenge to IBM may be a short-lived victory for Rodime. "It's inconceivable that they could leverage this win into competitive advantage before the market moves to 2½-in. drives," he said.

IBM's agreement to pay license fees to Rodime surprised observers, according to Jean Orr, an analyst at Labe, Simpson & Co., who said Rodime's patents had been considered to be much too broad to be enforced. However, she added, "experience tells us that IBM doesn't [make concessions] like this without a very good reason."

EDS cans System One deal

HOUSTON — A partnership that promised to add an estimated $350 million to Electronic Data Systems Corp.'s (EDS) coffers was suddenly scuttled last week in the wake of a legal challenge from IBM Credit Corp. (ICC).

In a joint announcement issued on Friday afternoon, EDS and Continental Airlines said they will modify the deal that originally would have given EDS a 50% stake in Continental's System One airline reservations system as well as an outsourcing contract with System One, Continental and Eastern Airlines. The new deal, they said, could focus on joint marketing and facilities management.

Details as to what blew the EDS/Continental deal out of the air were in short supply as the week closed. An ICC spokeswoman confirmed that the firm had filed a lawsuit against EDS and Continental earlier last week but refused to state the grounds on which the suit was based.

A hearing on the ICC action, scheduled for Thursday, was called off when it appeared that the the deal was off. According to the ICC spokeswoman, "it's history."

EDS and Continental, in the prepared statement, also cited "the fuel crisis facing the airline industry" as a reason for modifying the pact.

NELL MARGOLIS

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Multimedia boards tuned up for Comdex/Fall '90

BY MAURA J. HARRINGTON
CW STAFF

BILLERICA, Mass. — New Media Graphics, Inc. will announce a family of personal computer multimedia boards at Comdex/Fall '90 in Las Vegas next week that will allow a user to turn his or her PC into a television, a videoconferencing screen or even an interactive training facility.

Although there are already several similar video boards on the market today for PC users, Marty Duhms, president of New Media Graphics, said the new Super Videowindows board is more than 60% cheaper than competitors' boards, and it incorporates sound.

"My closest competitor, the IBM Motion Card, sells for $2,250. My board will retail for $695," Duhms said.

Duhms, who has been selling a video imaging board product called Videowindows AT for two years, said that in addition to the sound control capabilities, a new chip with "all the necessary video manipulation capabilities," developed for New Media Graphics by Chips & Technologies, Inc., is responsible for big savings in manufacturing costs in Super Videowindows.

The new chip, called the PC Video chip, will be formally introduced at Comdex and can run under either Microsoft Corp.'s Windows 3.0 or Hewlett-Packard Co.'s version of Windows 3.0, which includes its New Wave graphics package, Duhms said.

New Media Graphics will also introduce three daughter cards at Comdex designed to attach onto the Super Videowindows card without taking up another slot in the PC.

They will include the Super TV tuner for $395; the Super Video Graphics Array daughterboard with 1M byte of video memory for $395; and the Super Compression Card, due out in March 1991. Pricing for the latter has not yet been set, Duhms said.

UVC Corp., based in Irvine, Calif., is also experimenting with compression/decompression technology. Last week, the company announced its Multimedia I Processor board and Multimedia Plus Software products, which included a "full multimedia processor board" with compression/decompression capabilities, a company spokesman said.

The board will have an estimated price of $799, and the software will cost from $199 to $299, the company said.

3Com reshuffles one more time

BY JIM NASH
CW STAFF

SANTA CLARA, Calif. — Change, one of the few constants being produced by 3Com Corp., continues at the networking company.

Analysts and even some company insiders said they were surprised last week to hear that Les Denend, executive vice-president of product operations, had bolted to Vitalink Communications Corp. One day later, on Oct. 31, 3Com reorganized its product divisions.

The jinks come on the heels of wrenching administrative changes that began last year. Denend, who oversaw day-to-day activities in 3Com's diverse product units, was one of the three executive vice-presidents who had vied for 3Com's presidency. An aborted attempt to seat Ken Oshman, chairman and chief executive officer of Echelon Corp., as president in March precipitated an unexpectedly swift board of directors' decision to promote Eric Benhamou, head of product operations, to president.

Since then, 3Com founder Bob Metcalfe has left the company, and Chairman and former CEO Bill Krause has retreated to his chairman role, handing the CEO title to Benhamou. There has been no word as to who will replace Denend.

Denend said that disappointment at not being chosen to lead did not play a role in his decision to leave 3Com: "I saw Eric over the summer and fall expanding into his new role as president, and I decided I would like to have that kind of role." Then, he said, first-quarter results made it clear to him that management had to be flattened, eliminating his product operations post.

Reaction to Denend's move varied from disinterest among 3Com resellers to death knell predictions from one analyst. Bob Buchanan, a former group manager at 3Com's Distributed Systems Division, said the news came as a surprise to him.

Buchanan, who left 3Com in September to become vice-president and general manager at Lanquest Group, Inc., a consultancy in San Jose, Calif., said Denend had been a mismatch for his product operations post. He said Denend's strengths were more in management and less in knowledge of technical issues surrounding 3Com's diverse product lines.

Under the reorganization, 3Com's Work Group and Enterprise Systems Divisions have been folded together to form the new Network Systems Division. Another new unit, the Network Adapter Division, was also formed. Benhamou will manage the Network Systems Division.

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Benchmark executable file size	**104,713 bytes (2.6 times smaller)**	282,288 bytes	282,288 bytes
Benchmark source available for review	**YES**	NO	NO
DOS memory extender included	**YES**	NO	YES
No-charge run-time for DOS memory extender	**YES**	NO	NO
No-charge EBCDIC support under CICS and IMS	**YES**	NO	NO
OS/2 Presentation Manager support	**YES**	NO	YES
Dynamic Link Library support under DOS and OS/2	**YES**	NO	NO
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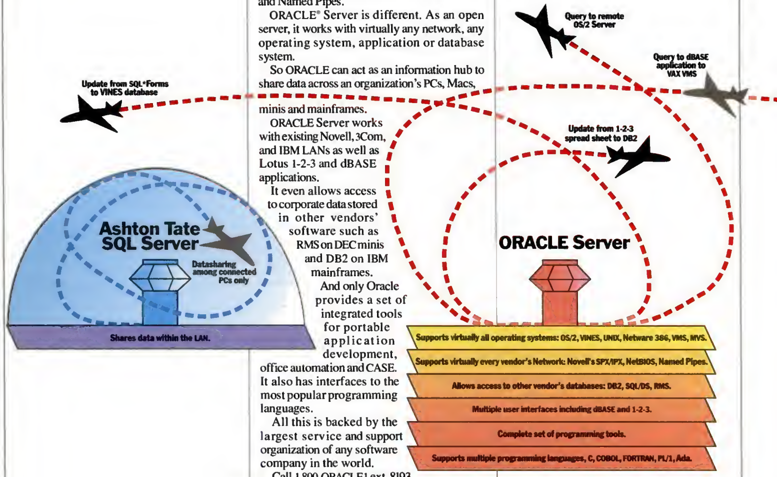
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IBM and DEC pump up workstation offerings

BY MARYFRAN JOHNSON
CW STAFF

NEW YORK — IBM and Digital Equipment Corp. last week shored up their positions in the workstation market with new offerings that substantially boost the high-end performance of both companies' Unix-based machines.

IBM introduced the RISC System/6000 Powerstation/Powerserver 550, a deskside "minisupercomputer" priced in the $130,000 range and running at 56 million instructions per second (MIPS). The company also expanded its offering of 4M-bit memory technology, previously available only on the Model 540, to quadruple system memory capacity on other RS/6000 models.

IBM also introduced a more powerful, 25% faster version of the AIX Fortran compiler that will be available in March 1991 for the RS/6000.

DEC unveiled two "second-generation" processors for its reduced instruction set computing (RISC)-based Decsystem line — the entry-level Decsystem 5100 and the Decsystem 5500, the most powerful Unix uniprocessor now available from DEC. The Maynard, Mass.-based vendor also trotted out seven software applications and tools and cut prices on its low-end Decstation workstations by as much as 32%.

The Decsystem 5100, at a base system price of $10,995, runs at 19.4 MIPS under Ultrix Version 4.1, DEC's new version of its Unix-based operating system. The new entry-level machine has a memory capacity of 8M bytes to 128M bytes and a storage range of 209M bytes to 4.4G bytes.

The Decsystem 5500, at 28.2 MIPS, is priced from $41,900 and supports memory from 32M bytes to 256M bytes and storage from 355M bytes to 28G bytes. Both systems are scheduled to be available in December.

At Bankers Trust Co. in New York, where DEC and IBM are the two major computing platforms, the new Unix boxes were good news for departments "in need of serious compute cycles," said Shalom Bryski, manager of VAX systems and networks at the bank.

AIX evaluation

One month ago, Bankers Trust began evaluating AIX, IBM's implementation of Unix, on an RS/6000 Model 320. There are also 10 to 15 Decsystems in place, some of them already in production use as computational servers.

"Between these two vendors, it's been fantastic for us," Bryski said. "When I compare how it's so expensive and difficult to get the two platforms talking to each other under their proprietary operating systems, the same thing in their Unix-based stuff is fairly trivial because they've agreed on the same set of open system standards."

"DEC is probably becoming most competitive with itself," said Robert Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco. "For anybody with VAXs in a technical computing environment, [the Decsystem 5500] is probably an argument for even the truest blue of DEC accounts to replace their current computational server."

On the software front, DEC announced four Ultrix-based products for integrating information across networks and three software development tools that run under both VMS and Ultrix.

While DEC made no mention of the enhanced Mips Computer Systems, Inc. chip powering the speedier Decsystem 5500, that R3000-A chip enables a speed of 30 MHz, while its predecessor Model 5400 ran at 20 MHz. The chip also synchronizes the CPU and floating-point processors in the 5500 to improve multiprocessing capabilities.

User excitement grows as Unix attracts more attention

BY JOHANNA AMBROSIO
CW STAFF

NEW YORK — Unix Expo, held last week, yielded no real surprises. Instead, companies unveiled products in line with already-announced strategies.

Still, there was palpable excitement on the show floor. People were talking about what impact, if any, the Open Software Foundation's OSF/1 operating system would have on the Unix market. Digital Equipment Corp., IBM, Siemens Nixdorf Information Systems and others were demonstrating OSF/1 in their booths. However, opinions about OSF/1's success are still very mixed.

Another source of excitement — among the vendors, at any rate — was how this appears to be the year that Unix began receiving more corporate information systems attention. During one of the keynote speeches, the crowd was asked who among them were considering Unix for the first time. At least half of the people's hands shot up.

Michael A. Kaminski, manager of computer-integrated manufacturing and networking technology at General Motors Corp., said the plethora of products on the floor should help users implement Unix and other standards. "For a long time, there were no real open systems products available, and users blamed that for not implementing standards," he said.

In addition to workstations from DEC and IBM (see story above), hardware announcements included the following:

- NCR Corp. added an industry-first bonus to its product line by bundling the OSF/Motif graphical interface window manager into its display stations. By running Motif locally rather than on a host, the stations reduce host communications.
- Network Computing Devices, Inc. broadened its extensive X Window System display line with a $1,495, 15-in. monochrome terminal, which the company said breaks a new price/performance barrier. The NCD15B offers screen resolution of 1024 by 800 pixels and is based on the Motorola, Inc. 68000 chip.

Software and communications announcements were also the order of the day. A score of vendors, among them Oracle Systems Corp., Informix Software, Inc. and Information Builders, Inc., said they had ported their software over to new hardware platforms.

Also unveiled at the show were the following:

- The first Unix implementation of Supra, Cincom Systems, Inc.'s relational database management system, for Sun Microsystem, Inc. workstations. Supra will be ported to four other Unix platforms, including IBM's RISC System/6000.
- Saber C++, a C++ programming environment from Saber Software, Inc.
- Suncobol, a distributed version of the programming language for Sun's Unix workstations, available from Sun.
- Communications software designed to connect Unix systems to IBM mainframes, from Rabbit Software Corp. in Malvern, Pa.

Senior writer Joanie M. Wexler contributed to this report.

Manzi links Unix success to Lotus

NEW YORK — Lotus Development Corp. President Jim Manzi was hardly humble during his keynote speech at last week's Unix Expo. He told hundreds of attendees that much of the future success of Unix on the desktop will be attributable to Lotus' rollout of its 1-2-3 spreadsheet package designed for that operating system.

"Unix will gain significantly from its support by Lotus," asserted Manzi, who noted that two versions of 1-2-3 for Unix — one for Sun Microsystems, Inc. workstations and one for AT&T's Unix System V — started shipping this year. He said there are currently 15 million 1-2-3 users, and "10% of all data entered into desktops goes through 1-2-3."

Manzi ambitiously predicted that by 1995, 25% of the desktop market will belong to Unix. He also took the opportunity to roast nemesis Bill Gates, president of Microsoft Corp., which focuses on software for MS-DOS and OS/2 operating systems rather than Unix.

"Bill Gates forecasts no future for Unix on the desktop," Manzi said, "though I have to believe his perceptions are colored by self-interest."

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Sears buys into high-end connectivity

BY ELISABETH HORWITT
CW STAFF

Sears Technology Services, Inc. set its data center connectivity strategy on the bleeding edge last week by announcing plans to replace its IBM 3745 front-end processors with the recently announced IBM 3172 Interconnect Controller and a third-party switching platform.

The firm, a division of Sears, Roebuck and Co., will become the premier customer of a high-end switching product introduced last week by Network Equipment Technologies, Inc. subsidiary Adaptive.

The Adaptive Synchronous Optical Network Transmission Manager (STM) will provide dual 45M bit/sec. T3 connections between each of Sears' three data centers and will support up to eight hosts at each center, according to Gary Weis, senior vice-president of networking and technical services at Sears.

The firm will be using the Model 18 STM, which is said to support up to 18 T3 links, and plans to have completed installation by the fourth quarter of next year.

In the same time frame, Weis said, Sears will link the mainframes at each data center with IBM's Enterprise Systems Connection, a fiber-based high-speed link announced last September.

The STM-18s will also be used as the basis of a T3 backbone that will concentrate multiple 1.5M bit/sec. T1 lines from various remote Sears sites, Weis said. Sears' existing IDNX T1 switches will feed into the STM hubs, and IBM's Netview will manage both types of switches via a homegrown link that Sears originally developed for the IDNXs, he added.

Sears apparently feels little unease about purchasing a product that not only combines a number of embryonic technologies, such as Synchronous Optical Network and frame relay, but also has not yet gone into beta testing and will not ship until the middle of next year.

"The switch is industrial-strength, [telecommunications carrier] quality," Weis said. "Its redundant architecture and hot pluggability," which enables modules to be taken out and put back in without interrupting service, "is crucial, given Sears' high-availability environment."

However, the firm will hold off on tentative plans to use the STM "for more traditional T3 multiplexing" at additional sites until it has evaluated the product at its initial installations, Weis said.

The 3172 Model 2s, which IBM announced last September, will support multiple T1 links between the hosts and STM switch at each site.

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TI factory cited for automation

BY MITCH BETTS
CW STAFF

LUBBOCK, Texas — At Texas Instruments, Inc.'s consumer electronics plant, computer-integrated manufacturing (CIM) systems have reduced manufacturing costs enough that a competitive line of pocket calculators can actually be "Made in the U.S.A."

The calculators — packaged in red, white and blue — are being sold at Wal-Mart Stores, Inc. outlets nationwide, and the TI factory won the Automation Forum's Renewal Award last week for bringing manufacturing back to North America.

The award sponsors praised the managers at TI Lubbock for their bold decision to compete against Far East manufacturers known for their low-cost production facilities.

The Lubbock plant uses a highly automated, continuous-flow production system that turns raw plastic pellets into a finished calculator (packaged and ready to ship) in just 20 minutes.

"So integrated is the production line that the plastic cases are still slightly warm to the touch from the molding operation when the electronic components are installed," said William Rolland, executive director of the Automation Forum.

The CIM system and the calculator itself were designed to lower production costs; the calculator has only seven components, for example. Robotic arms remove the plastic parts from the molds, apply decals and seal the components.

However, the heart of the CIM application is a TI 990 minicomputer and several microcomputers linked to sensors on the assembly line, according to Ken Barnes, equipment engineering manager at the Lubbock facility.

The system provides real-time monitoring of the assembly line, which gives immediate feedback on throughput, scrap and yield from start to finish. "We know exactly what's going on right now, any place on the factory floor," Barnes said.

An Ethernet network links the shop floor to TI's accounting and inventory systems. In addition, TI's suppliers can call into the factory's minicomputer to find out if any parts were defective.

Barnes said the Lubbock factory plans to improve its 20-minute record by eliminating manual operations.

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EDI test drive

■ Thinking about setting up an electronic data interchange (EDI) but reluctant to give it a whirl? Foresight Corp. has introduced what it calls an EDI Simulator, designed to facilitate setting up and testing an EDI system. The simulator package also includes Edisim software for mainframes, allowing the user to generate EDI test data of any type or quantity, the company said.

Supercool chip

■ Velox Computer Technology, Inc. said that it can crank out a 50% higher microprocessor clock speed by lowering the microprocessor's operating temperature to a brisk 0 degrees Celsius and precisely controlling the voltage. That means an Intel Corp. I486 rated at 33 MHz can be made to run at 50 MHz, the company said. The company's first product based on this new class of ICEC, shorthand for integrated circuit, environmentally controlled component, will be an add-in module called the Icecap 486 for personal computers based on the I486 microprocessor. The module consists of a special cooler and electrical unit in an insulated enclosure that controls the temperature and voltage of the principal integrated circuits of a PC at their peak performance point. The company plans to sell it for about $150 in OEM quantities.

Embedded lead

■ A new report published by Electronic Trends Publications, a market research firm, concludes that the U.S. will continue to lead the rest of the world in the embedded controller market. Demand is rising for 8-, 16- and 32-bit advanced controllers, a market already dominated by U.S. firms, while demand for 4-bit controllers made by Japanese firms is slackening, the firm said. International shipments of microcontrollers, microprocessors and embedded processors will top $8.3 billion in 1995, rising from $3.3 billion in 1989.

With complexity, a threat of chaos

Scientists to discuss whether system complexity could lead to life-threatening glitches

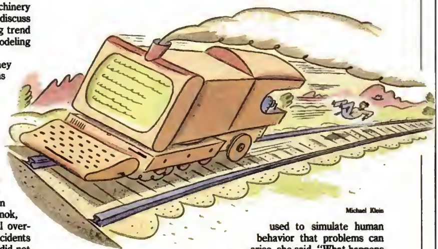
BY MICHAEL ALEXANDER
CW STAFF

Elaborate computer systems are increasingly being used to control everything from long-distance telephone calls to transcontinental flights. Now, some computer scientists worry that such complex computer systems are not as reliable as needed and, should they fail, they would set off mishaps that could result in the loss of life.

Tomorrow, about 100 computer scientists will convene to discuss their concerns about the reliability and safety of complex computer systems during a two-day summit meeting in Arlington, Va., sponsored by The Association for Computing Machinery (ACM). The scientists will also discuss what some said is a disquieting trend toward the use of computer modeling to simulate human behavior.

Many of the scientists said they fear that as computer systems become more elaborate, they may be more prone to the sort of software glitches that triggered the shutdown of AT&T long-distance service for several hours early this year.

For example, the scientists pointed to such calamities as the two accidental downings of civilian aircraft and the radiation therapy machines that run amok, exposing four patients to fatal overdoses of radiation. Those incidents were caused by software that did not perform as expected, they said.


Michael Klein

"Commercial pilots are getting more and more information from radar and computer systems on board and not from their own senses," said Frederic Withington, a computer consultant and member of the ACM program committee. "If the information is wrong, the results can be disastrous, as in the case when the Soviets shot down a Korean airliner that had strayed into its territory. The flight was shot down basically because of a misprogrammed computer."

The nanosecond suddenness with which some events occur using computer-controlled systems means that we must also depend more on the systems and not on common sense when coping with emergencies, Withington said.

"We need to do our jobs [as software engineers] better, exercise software more thoroughly and anticipate problems, perhaps with a fail/safe mode so the system can sense when things are not right," Withington said.

In some instances, software engineers simply lack the intellectual capacity to develop nearly foolproof complex computer systems, said Anthony Wasserman, a software engineer and president of Interactive Development Environments, Inc. Systems such as multinational air traffic control may be beyond our grasp, but that is not stopping engineers from attempting to build such systems, he said.

"The fact is, whether it is a system for home shopping or electronic funds transfer, there is a level of complexity, and we need to better manage it," Wasserman said. He advocated a more structured approach to software design, which traditionally has been treated as a "programming mystique."

Complex systems are not necessarily less reliable, but more can go wrong, he said. For that reason, software engineers must do a more careful job of analyzing the risks associated with a complex system, even if it means stretching out the design process, Wasserman said.

Some scientists at the summit meeting also fretted that the growing reliance on computer modeling may lead some to use the technology to support conflicting points of view. For example, the scientists pointed to the use of computer simulations supporting conflicting theories of such hotly debated issues as global warming and the possibility of a nuclear winter.

The most useful models are typically those that have been applied to the physical world, where there are small numbers of known variables, said Stuart Dreyfus, a professor at the University of California at Berkeley, whose expertise is in examining the limits of modeling. Applying modeling to socioeconomic situations or trying to predict human behavior "can lead to making inferior decisions," Dreyfus said.

For example, studies show that managers do not do a lot of detached meditation before making a decision, Dreyfus said. "They circulate, gossip and use intuition, not methodologies." Even the best of expert systems fail to come close to turning this sort of experience into rules that a computer can follow, he said.

"As long as we see models as untrustworthy but interesting, or as a new tool with error correction, they are not totally irrelevant," Dreyfus said.

When applied to limited variables with known interaction between those variables, computer modeling can be a "fabulous tool," agreed Eleanor Wynn, an anthropologist and publisher of *Information Technology and People.* It is when computer modeling is used to simulate human behavior that problems can arise, she said. "What happens so often is that they begin assuming that model is a reflection of the real world and not a hypothesis."

One reason that computer systems fail is that their designers did not adequately consider the human element in their planning, said Rod Leddy, systems training consultant at Mobil Oil Corp. Computer-supported systems have to be designed with communication between users and technicians rather than from a distance or a set of abstractions, he said.

One solution may be to require computer scientists to study sociology, philosophy and other areas. European computer scientists have a broader education and are more comfortable incorporating those areas in computer systems design, Wynn said.

Despite fears that computer system failures will become more frequent, the scientists said they see cause for optimism: Computer users are more knowledgeable and are cooperating more closely with computer manufacturers to develop better systems; integrated sets of software tools are making software cheaper and more reliable; and new methods known as software quality metrics are helping to make software of complex computer systems more foolproof.

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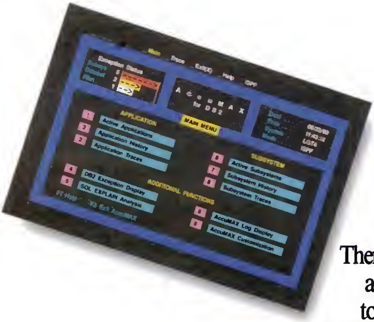

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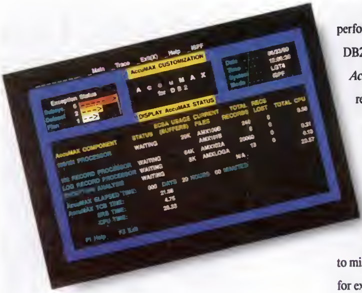

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EDITORIAL

War?

THIS NEWSPAPER AND others plastered the word "war" all over their front pages several times two years ago to describe the fractionated Unix market, split between the AT&T camp and the then-forming Open Software Foundation (OSF).

In retrospect, the phrase "smoke screen" might have been more appropriate. For the OSF has finally released its version of the operating system, but its very backers, who so proudly shared center stage at the unveiling of the OSF, are responding rather limply to the product of their own creation.

In fact, only two of the seven companies that formed the OSF have committed to using the new product on all of their open systems. The biggest OSF sugar daddy, IBM, will continue using its own brand of Unix for its hot-selling workstations — at least for now. Others in the group will rely on AT&T's Unix System V.

And some users who have dissected the OSF's product have found, as one customer told us, "no real difference among the different types of Unix." No difference, no war — just smoke.

If you sold a product and it was fairly unique ("proprietary," in today's parlance) and it made you lots of money, how great would the incentive be to aggressively sell products that others would be free to sell as well? Herein lies the reason why the OSF will not live up to all the hoopla and promise surrounding its creation.

There just isn't a strong incentive to move to open systems when you can sell a proprietary high-margin item. This assumes customers are willing to buy these proprietary products, which they still are — and in large numbers.

Editor's note

During the next five years, information systems will place some of the biggest-ever technology bets as a result of the exciting technologies that are emerging. Thus, it is no surprise that IS management has found its attention turning slightly more toward technology issues as management mulls the platforms and architectures of the future.

To address this growing need to assess and evaluate new technology, *Computerworld* has added several features in the last year, including our monthly Buyers' Scorecard and product benchmarks, as well as our weekly Advanced Technology page. We will also expand the number of Product Spotlights we present in 1991.

This week on page 38, we unveil Technology Analysis, which we hope you will find to be a comprehensive analysis of some of the hottest new products. Tech Analysis combines a digest of findings of the best product testing laboratories with the insightful analysis of industry experts, Wall Street watchers and user input to yield a truly complete technology assessment. The section will run every other week until the end of 1990 and weekly thereafter.

LETTERS TO THE EDITOR

Geography 101

In the Executive Report article "Information must conform in a world without borders" [CW, Oct. 1], Mr. Huppertz is quoted as saying that it is necessary to forget most of what was learned in geography class. I am currently in an MBA/Information Systems program, with a background in geography. I believe that geography is more important than ever to markets, business and IS.

When working with people in other countries, one must understand the peculiarities of the cultures that exists there. More than one businessperson has lost sales because of a cultural faux pas.

Also, should one decide to expand or relocate, knowledge of geography is essential to doing proper cost and feasibility studies. As an IS person, you had better be sure that the area where you set up will be able to support your system.

There are still many places in the world that cannot support digital communications without a major capital investment in materials and support, and if that is a part of your business, then you had better know where this occurs.

The values and standards that we take for granted here in the U.S. do not apply to many other places in the world. We need to remember that the U.S. is no longer a big fish in a small pond.

John A. Slater
Walnut Creek, Calif.

No guarantees

Regarding the article by Lee Gruenfeld, "Even if you have a warranty, you may not have a guarantee" [CW, Oct. 1], the case was tried in the Massachusetts Superior Court. The appeal was to the Massachusetts Appeals Court, not the U.S. Court of Appeals. The feds had nothing to do with the case.

Secondly, the real question the appellate court decided was which innocent party should bear the loss; both had relied upon erroneous statements by the hardware manufacturer as to response time. The manufacturer was not a party to the litigation.

What really disturbs me is that your readers who are users may get the idea that the user wins most of these cases. Mr. Gruenfeld says, "Customers are usually favored in these cases because the court often finds computer warranties to be ambiguous, unclear or 'unconscionable.' The theory is that the customer is the novice in the deal, and the vendor is experienced." Not true. I've been reading computer contract cases since the first opinion was handed down more than 25 years ago. The hardware and software companies win many of the cases, probably a majority. The courts don't find the clauses unconscionable very often, and the "novice" argument is just about dead.

Robert P. Bigelow
Counselor at Law
Winchester, Mass.

Something for all

Regarding the In Depth article by John Chisholm [CW, Oct. 8]: Is he aware that IBM has tried to abandon both VSE and VM? The resultant user uproar has forced IBM to keep both products. VSE users are tired of being told that they are "nonstrategic." They use VSE because it meets their needs in a way that neither VM nor MVS can.

The same holds true for VM users. Not all companies need the same features in an operating system. If they did, there would not be the multitude of processors and vendors available to the user community across the range of micros to mainframes.

IBM is primarily a hardware, not software, company. IBM's real competition in the mainframe arena lies with Hitachi and Fujitsu. The price tag associated with a project like Mr. Chisholm's "modest proposal" would have to be funded from hardware sales and not software license fees. Any attempt to fund such an undertaking with software fees would seriously impact sales of hardware as companies reevaluate computing needs in light of reduced corporate spending. Both Hitachi and Fujitsu offer quality hardware at a lower cost than IBM.

A first step toward Mr. Chisholm's goal is the family of ESA operating systems. Let's see what type of price tag these carry when they are delivered and their impact on the majority of IBM system users is known.

Cynthia G. Kern
Delaware Service Co.
Philadelphia, Pa.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

Good growth, happy customers

PHILIPPE BEAURAIN

The American Dream: Take an original idea, nurture it, turn it into a thriving business — and then sell it for an enormous profit.

This is the dream that has cast its spell over many an enterprising company, but nowhere is it more apparent than in the computer software business and other high-tech industries. Up-and-coming firms in this arena are the ones that can cite the most impressive growth figures — and revel in the widespread public attention they attract.

And yet, behind the allure of fast growth lurks a basic problem that can jeopardize a company's very survival. For too many companies, a single-minded focus on growth ends up leaving customers in the lurch.

The problem comes from losing sight of long-term goals for the sake of immediate growth. A chief executive officer can become obsessed with how the company is perceived by potential investors and buyers and be more concerned with revenue than profits.

He might focus on tactics that boost quarterly earnings rather than on strategies that are customer-oriented, such as innovative employee training and quality programs.

Growth can become the No. 1 priority, at the expense of quality and — ultimately — customer satisfaction.

Massacre that myth

This brings up one of the most dangerous myths in the business world: that growth is inherently good. The only deadlier notion may be that if some growth is good, more must be even better. The truth is, despite the homage many top managers (and market analysts) pay to growth indicators, they do not necessarily mean that a company is in good health.

In a competitive environment, of course, managers must fight for market share, but they must also examine the impact such increases would have on the quality of their products and the needs of their customers.

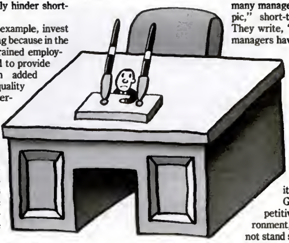
In fact, a clear focus on these basics — quality and the needs of customers — is the best guide to healthy, controlled growth — the kind that truly serves a company's best interests.

As managers, we must look beyond quarterly profits and analyze the long-term impact of our decisions on the basic elements of the business. At times, the best decisions may be the ones that actually hinder short-term growth.

We may, for example, invest heavily in training because in the long-run, well-trained employees are essential to provide customers with added value through quality goods and/or services.

In many decisions (e.g., pursuing new or larger contracts), we must put ourselves in the customer's shoes to provide the sense of direction we need.

No matter how tempting the opportunity, we need to be realistic about how much business we can manage effectively without sacrificing the quality of our workmanship or jeopardizing the faith of our customers. Remember: If we fail in these basic areas, we will fail as a business.



Stuart Goldenberg

Whether we are adding new facilities, expanding product lines or growing a whole new business area, these basic issues still rule. If we cannot ensure them, even the most impressive-sounding growth jump will be a mistake over the long run.

It is better to have steady, "boring" revenue increases of 35% for two years than 65% for one year and 10% the next.

With this outlook, growth isn't as much a matter of sales forecasts and capital budgeting as it is a practical concern for satisfying customers, both old and new. This must be the driving force, as well as the control, behind growth decisions.

It must also be the core value for staffing, because in virtually any business, customer satisfaction is directly related to the knowledge and commitment of the people who make up the organization.

According to William Davidow and Bro Uttal in their recent book *Total Customer Service*, current economics have forced many managers to adopt "myopic," short-term philosophies. They write, "The result: Many managers have developed an involuntary reflex of trimming any business activity whose impact on profits isn't immediately obvious to a first-year accounting student — or an institutional investor. Customer service is a favorite victim . . ."

Given today's competitive business environment, companies dare not stand still; we must move forward, adapt and grow. The challenge is to do so with a clear sense of how much and how fast, without short-changing customers or compromising the quality of products and services. Even if our goal is the "American Dream," we need a solid foundation of reality on which to build.

Beaurain is president of GSI Transcomm, a Pittsburgh-based software company.

Abort, retry, ignore — truth about the PC age

GLENN RIFKIN

I will never be a power user of PCs, just as I will never be a power forward for the New York Knicks. It's not that I don't covet these things; it's just that I am not cut out for either sport. I'm far too short, far too slow and far too left-brained (or is it right-brained?).

I don't feel all that bad about this, mind you. I expect there are only about 50 or 60 power forwards in the NBA, and I'm confident there are only 12 power PC users. Slam-dunking is one thing, but have you ever tried to hook up a printer or install a memory upgrade board?

The problem with PCs is something I call the Barrier to Entry. This concept is based on the theory that PCs don't really want to let you in. Of course, they are very sneaky about this. They lull you into a sense of accomplishment by letting you boot up the system and even open a file in some application program. Some of you clever types will even do this several times, and that smug feeling will come over you. "I've got this thing licked," you think to yourself. Then comes the surprise.

Systems people call the surprise a glitch. The glitch comes in many disguises: It comes as an error message. It comes as a garbled screen. It comes as a printer that runs out pages with strange margins and bizarre type fonts.

Your first instinct is to panic. You quickly type in a command that should stop whatever horrible deed is being done on the screen. It does no good. You try the command again (maybe it didn't hear you). Still nothing.

If you are a masochist, you pick up the dog-eared documentation manual. You flip quickly to the back, where it lists things that can go wrong and what to do about them. Inevitably, whatever is happening to your system isn't there.

You toss the manual across the room and type in another command: Stop Doing This. The computer responds: Bad command. Bad boy. Bad dog. You're being reprimanded by a machine. You hit the return key. The screen says Abort, Retry, Ignore. What does it mean, Ignore? Ignore the frustration? You type Abort, and nothing happens.

Right about now, I start reaching for the monitor with an eye toward the window. But I know deep down it isn't the poor monitor's fault — it's sort of like killing the messenger. The PC is just a damned box, and it won't fit through the window anyway.

Instead, I shut the system off. The pathetic sound is an electronic sigh. It says, "Haven't you gotten the message by now? Haven't you had enough?" And it is right. I have had enough. I stomp upstairs, pick a fight with the cat and turn on Donna Reed reruns on Nick at Nite.

It's no accident that I escape to my beloved TV. That is technology at its best. I hit a button, and on it goes. I hit another button and change the channel. I hit yet another to make it go mute when a commercial comes on. I hit another, and it clicks off obediently without a bad attitude.

Don't think this isn't embarrassing. I mean, here I am writing about this stuff for years, making a living documenting the Information Age, and I still approach my PC as if it's going to give me a tetanus shot. You are probably sneering right now. You technology pros look at the PC the way Richard Petty looks at a Honda Civic: After you've driven a Formula One, the small ones ain't worth a sneer.

But maybe there are more than just a few IS pros who have spent their careers working on 370s and 3090s and VAXs and find these PCs just a bit unnerving. Maybe DOS looks like Swahili to a few of you as well. Come on, I'm right — sure I am.

HERE I AM making a living documenting the Information Age, and I still approach my PC as if it's going to give me a tetanus shot.

You probably hired a young PC maverick to handle the problems and questions pouring in from the bewildered populace. Perhaps you conceived (or agreed to) an information center approach. And then you walked back to the water cooler and breathed a sigh of relief.

You've even got a PC on your desk, humming away near the family photos. You sort of grew fond of the little critter and find yourself pumping out E-mail messages or memos now and then to keep up appearances.

You also remember the day you decided to load up a new accounting program by yourself. You didn't bother with the manual because it should be self-evident once you got going, right?

Two hours later, the young PC whiz came rushing in the door just as you were about to drop the monitor out the window. Your secretary gave you a glass of water and led you to a chair while you muttered, "Abort, retry, ignore, abort, retry, ignore."

The PC guy sat down smiling at the keyboard. He began to type a series of commands. It was a blur of backslashes and colons, and he whipped through functions that you couldn't find even if you had another decade to poke around.

Fifteen minutes later, be stood up, rubbed his hands together and said, "Boss, you're golden. Come on back now, and you won't have any problems."

Ten minutes later, you were stuck again — horribly, inexplicably, forever. You shut the machine off, wandered quietly to the data center and stroked your System 38.

I personally have relied on a first-class PC expert to get me through this nightmare. Unfortunately, I have a feeling she is getting tired of sitting next to me all day and wants to go back to her office.

Rifkin is a *Computerworld* features editor.

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COMMENTARY

Lori Kleinman

In-house options

Finding the right vendor to help you with your minicomputer and mainframe software support needs is like finding a good dentist — you want someone who can respond quickly to your pain and won't cause you to scream about the size of the hole drilled in your budget.

Too often, users worry about what services vendors offer without fully considering the talent and performance records of their in-house support staffs. Ledgeway research has repeatedly shown that internal staffs outperform outside vendors. So why not take advantage of this knowledge and use internal benchmarks to set problem response and resolution time standards for your vendors? Users who appreciate the value of applying internal support standards to their outside vendors will gain far greater performance from their support providers and get more bang for the buck.

Customers feel that they have two choices when looking for minicomputer and mainframe software support — their internal staffers, who typically reside in a centralized data center, or an outside support sup-

Continued on page 32

Uniting VMS and Unix could foster innovation

BY MARYFRAN JOHNSON
CW STAFF

Like mixing oil and water.

That was the first reaction many users had to the recent news that Digital Equipment Corp.'s 13-year-old, proprietary VMS operating system will eventually run Unix-based applications.

"There are a lot of VMS shops with too much investment in customer applications to change," warned Gerald Siddons, director of scientific computing at the Dana-Farber Cancer Institute in Boston.

Yet while a healthy dose of skepticism greeted DEC's bombshell announcement [CW, Oct. 29], industry analysts and customers alike were intrigued with the possibilities.

Siddons said he could envision, for example, how his colleagues at Children's Hospital in Boston — a stalwart VMS shop for its patient records and financial applications — might be able to pull in some renegade researchers now working on Unix-based machines with the prom-

Continued on page 33

Opening up DEC

DEC's open systems strategy is supposed to provide users with application portability among different vendors' machines — the ability to develop an application on one machine and run it on any computer in the network. The strategy has three major threads:

- Eventual compliance with Posix standards now under development by the Institute of Electrical and Electronics Engineers, Inc. Next quarter, DEC will field-test three Posix standards that cover applications interface, shell utilities and real-time processing.
- Applying for certification and "branding" of VMS by the X/Open Consortium, a standards body in the process of defining a common application environment based on de facto and internationally accepted standards. To get X/Open's XPG3 verification, a company must submit its operating system to a battery of 5,232 tests run by Unix System Laboratories, Inc.
- Support for key standards developed by the Open Software Foundation in Cambridge, Mass., for its Distributed Computing Environment.

MARYFRAN JOHNSON

Officevision: A great debate

BY ROSEMARY HAMILTON
CW STAFF

Although thousands of people will be using IBM's Officevision by the end of 1990, it still struggles with a negative image.

According to Tony Mondello, IBM's vice-president of office systems development, Officevision is misunderstood. But according to one market research firm, the industry is not confused about Officevision. In a report scheduled for release this week, Forrester Research, Inc. in Cambridge, Mass., asserts that Officevision will be a modest success as host software but will fail as a desktop system.

"Officevision will continue forever," said Stuart Woodring, an analyst at Forrester. "But the question is, what will be the value of those products?"

Mondello, who is critical of the Forrester report, said Officevision has been a success and pointed to an expected user base of nearly 1 million by year's end as proof. The total includes the nine products under the Officevision umbrella, including decision support and executive information software, as well as upgrades of existing IBM office products, he said.

"There is a lack of understanding," Mondello said. "Maybe it's IBM's problem. We believe we understand the [office automation] problem, and we believe that this strategy will lead to the solution. We are only partially down the path today."

Forrester claims that a closer look at the Officevision installed base shows that it consists primarily of host upgrades, which in some cases are only renamed existing office software. As a result, the firm claims that while Officevision technically has thousands of users, only a few new users actually selected it over other vendors' products.

A big problem

Woodring said there is only a handful of users running the local-area network version of Officevision in production mode, and he sees this as a big problem.

First, he said, the desktop is an obvious strategic platform for the future. Secondly, of all the Officevision products, the LAN version is the only platform that did not have an existing set of office tools and would therefore require brand-new users.

He further claimed that the biggest chunk of Officevision installations comes from the Application System/400 community. This, he suggested, should not count as true Officevision numbers, because it is merely a renamed release of AS/Office, the initial OS/400 office software.

In response, Mondello said the host platform will continue to play a major role in information systems and cannot be overlooked. In the case of Officevision/400, he said it is not only a renamed but also a restructured product that users license separately from the OS/400 software. He also said that there are "a couple hundred users kicking the tires" of the LAN version.

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Paul R. Hessinger
Chief Technology Officer
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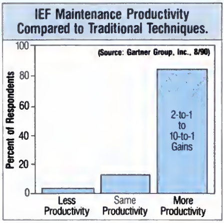
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) *IEF developers reported zero defects—not one abend had occurred in IEF-generated code.*

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, *more than 80 percent had experienced gains of from 2-to-1 to 10-to-1.* (See chart.)

Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that *all* IEF users who reported making application changes made *all* changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

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Full-service support.

Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

For more information, including a VHS video demo, call 800-527-3500 or 214-575-4404.
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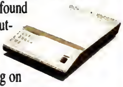
In Florida, NEC's I Series Intelligent Chassis System is now helping coordinate the life-saving efforts of Lake County's 911 services. The county chose the system after tests found NEC's I-Chassis modems outperformed others. And they've proved their round-the-clock reliability by being on the job there for more than a year without a single failure.



Since NEC modems are designed to rapidly and accurately transmit huge volumes of data, Lake County's 911 operators can now quickly pinpoint accident locations, provide traffic instructions, find patient medical records, and dispatch back-ups when needed. And because NEC's Dual Modem Card links 911's control center to NEC Dial-up Modems in remote locations, Lake County feels it has found the best data networking solution attainable.

Each individual I Series Chassis supports a wide variety of applications and products. These include synchronous and asynchronous operation in dial-up or leased line networks. Line speeds ranging from 300 bits/s to 56k bits/s with both analog and digital capabilities. As well as compatibility with CCITT standards such as V.32 and V.42/bis. Plus, the system's built-in flexibility eliminates product obsolescence by making it easy to add, mix, and match other chassis and data communications devices as network requirements change.

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Troubleshooting for success

Problem-tracking, feedback systems help ensure quality at GM plant

ON SITE

BY MICHAEL FITZGERALD
CW STAFF

FORT WAYNE, Ind. — A 1-month-old problem-tracking system and a major upgrade to an inspection feedback application are the latest systems tune-ups at what for four years has been one of the most technologically advanced plants in the General Motors Corp. empire.

GM's Truck and Bus Group Fort Wayne Assembly Plant was a green-fields project that was finished in 1986. Since that time, systems development — the addition of new applications and the enhancement of existing programs — has continued.

Electronic Data Systems Corp. (EDS), the GM subsidiary, in essence, acts as the company's information systems department. It also oversees the systems work at Fort Wayne, the most successful plant start-up in GM history, reaching production and quality targets faster than any other new GM plant. What remains to be seen by the public is how systems use at the Fort Wayne plant compares with the facilities in the newest GM division, Saturn.

Among the projects EDS is testing or has recently installed are systems designed to improve specific plant functions. For instance, a month ago, EDS installed a problem-tracking system for the paint shop. Before the system was created, workers were shotgunning solutions.

Eight months ago, EDS installed a project-tracking system for its maintenance and plant engineers and is scheduled today to install a major upgrade to the inspection feedback system, a crucial part of GM's quality assurance program.

EDS programmers wrote all these systems, which run on a Digital Equipment Corp. VAX cluster (two 8810s and an 8350) that serves as the area manager for the local plant. Monty Hansen, an EDS account manager at the Fort Wayne plant, said his staff in Fort Wayne had written the paint shop system; EDS employees in Oshawa, Ontario, wrote the project-tracking system; and EDS programmers in Troy, Mich., were responsible for the inspection feedback system.

The plant's host complex consists of two IBM 4381s, which are hooked together via a Systems Network Architecture gateway and linked to the VAX area manager by a DEC gateway. EDS makes heavy use of programs written in PL/1 to run the plant, using IMS on the host and Ingres Corp. Ingres on the VAXs.

Plantwide monitoring

The systems monitor approximately 5,000 points in the plant. The computer-integrated manufacturing process starts when a dealer orders a truck. These orders are processed and routed electronically. The only documents produced are those that are required by federal law. Once in the factory, the systems dictate the entire process of building the truck.

GM's Hansen *says better IS helps the company build better trucks*

Hansen has had to meet management challenges such as devising ways to ensure that basic line workers were comfortable with the technology and solving misbehaving pieces of the systems, such as the recurring problem that the plant had with its tire attachment process.

"They were getting a lot of breakdowns in this system, which is critical to the process of getting a truck off the line," Hansen said. "So we did some programming on programmable line controllers to be able to collect and analyze data, and we've since been able to have this run successfully."

Hansen and his staff occasionally respond to nontraditional IS functions. For instance, when the Occupational Safety and Health Administration decreed that each manufacturing area have clearly labeled safety instructions for equipment, the local EDS staff did the surveys and created the computerized instruction manuals that met the requirements.

Ideally, Hansen's staff operates as "Maytag repairmen:" there to troubleshoot, but rarely called on to do much.

Every minute

What kind of systems does it take to produce 230,000 trucks per year, at the rate of one per minute?

GM Truck and Bus Group Fort Wayne Assembly Plant has 56 large systems, ranging from mainframes to relatively small minicomputers, 110 microcomputers, 561 terminals, 316 printers and 577 communications devices.

The main systems are two IBM 4381s, two DEC 8810s and a DEC 8350 and 23 Hewlett-Packard Co. 1000 cell controllers that act as gateways between the main systems and the automated processors on the plant floor.

Operating systems in the plant include MVS/XA, VMS, Ultrix, DOS, Sun Microsystems, Inc. SunOS and even one or two Apple Computer, Inc. Macintoshes.

Also within the plant are some nine miles of redundant broadband cable, with Ungermann-Bass, Inc. asynchronous broadband links to file servers.

The plant was the first major user of what was then a GM-sponsored Manufacturing Automation Protocol, MAP 2.1. Saturn will use an updated version of MAP.

MICHAEL FITZGERALD

PC security controlled from mainframe

BY JOHANNA AMBROSIO
CW STAFF

GARDEN CITY, N.Y. — Computer Associates International, Inc. recently unveiled products that allow users to control personal computer security from a mainframe.

The products, called CA-ACF2/PC and CA-Top Secret/PC, work with their counterparts on the mainframe and build on CA's Cortana PC security package. Both packages run on MS-DOS computers; OS/2 versions are planned.

This allows users to do several things, CA said. One is to permit users to log on to both the PC and the mainframe with just one password. Another feature permits security administrators to audit, from the mainframe, all connections made from a PC to the mainframe to see who did what and for how long.

Users said they are looking forward to the enhanced security abilities. "I very much welcome the ability to administer security for all those systems from one place," said Nelson Beers, a data security officer at Union Trust Co. in Trumbull, Conn.

"If they do it, and it's done well, it's a feather in their cap," said David Wetter, senior data security analyst at Kelly Services in Troy, Mich. "I administer security for an MVS mainframe and a Novell LAN, and if I can have a single point of security administration, it would make me a very happy man. It would make my job a lot easier."

Yet another feature makes sure that each connected PC has an adequate level of security resident in it; if none is present, the mainframe will download a security package to the PC.

Both packages are slated for beta testing in January; general availability is scheduled for six months later. Although the PC products do not currently run on local-area networks, CA said that is in the works.

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The Death

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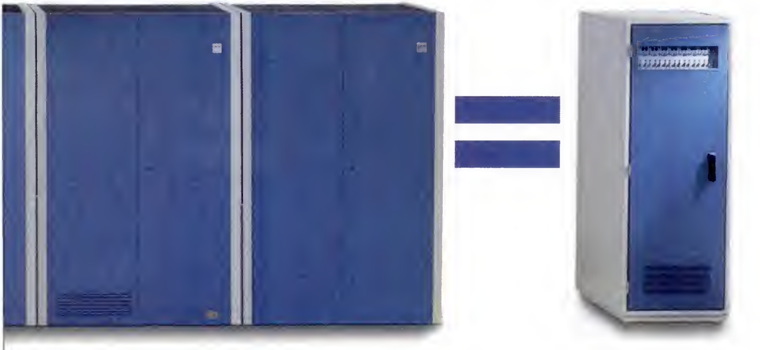
Of Bigfoot.



controllers manage all caching, data flow, and disk functions – while providing data transfer rates as high as 4.5 MB/sec. per CPU channel. Finally – a real breakthrough in reducing I/O bottlenecks.

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Symmetrix emulates IBM 3370, 3380, and 3390 storage devices. It brings MVS, VM, and VSE users the extended functions of IBM's 3990-3 control unit – such as write caching and mirroring – without an operating system change.

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EMC^2

Computervision in its Prime

ANALYSIS

BY SALLY CUSACK
CW STAFF

BEDFORD, Mass. — It was the late 1970s. Bell-bottomed blue jeans were "out." Billy Beer was "in." *Bonanza* was "out," but Charlie and his Angels were definitely "in." And Prime Computer, Inc., the successful Massachusetts-based minicomputer maker, made its first foray "in" to the world of computer-aided design and manufacturing (CAD/CAM) — a move that would one day prove pivotal to the company's survival.

Who would have thought? But industry analysts agree Prime's future rests with its CAD company, Computervision. With 150,000 installed seats, Computervision, the recent recipient of several major contracts, seems to be the brightest star in Prime's dimming constellation.

Fond of Medusa

John Steffan, vice-president at Steffan Associates, a St. Louis CAD consulting firm specializing in facilities management and architecture, said he thinks Prime will sell "a lot of Medusa on the Sparcstation systems." A Prime Medusa user for five years, he recently purchased Release 5.2, which came out earlier this year and allows Medusa to run on the Sun Microsystems, Inc. Sparcstation. Prior to that, Medusa was proprietary to the 50 series and Tektronix platforms.

"I love the [Scalable Processor Architecture] technology," he continued, ticking off increased functionality, screen menus and icons as reasons for embracing the Sun platform. He is anticipating Release 12 of Medusa, which will unite the existing two versions and allow the software to run on the Digital Equipment Corp. family of VAX systems while sharing Medusa's strong database functionality among platforms.

Steffan is apparently not the only one pleased with Computervision's current offerings. The company has won several major contracts and has established a strong international presence in several large firms, including Ontario Hydro of Canada, the Fiat Group in Italy and the Consumer Electronics Division of Philips N.V., headquartered in The Netherlands.

Computervision's current offerings include the following: the CADDS series of applications, running primarily on the Sun Sparcstation; Medusa, a set of CAD/CAM applications running on both Sparcstation and DEC workstations, and Prime 50 series and DEC VAX minicomputers; PDGS, Prime's original entry in the CAD marketplace; and the Calma product line, CAD/CAM/CAE three-dimensional software acquired from General Electric Co. in 1988 — the same year Computervision was acquired by Prime.

"They have made appropriate platform changes and have sorted out internal upheavals. They are now facing a life as a software company with a well-rounded product line," said Gisela Wilson, an analyst at International Data Corp.

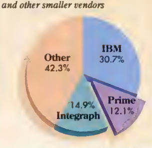
She added that while the company lost some momentum by refusing to be "pre-leading edge," it is catching up by working with other companies to sell and expand the Computervision product line. This includes a recent agreement with Sun to integrate Computervision's CADDS 4X software with the Sun Sparcstation IPC workstation.

Not to be outdone by its sister operating unit, Prime recently inked a four-year, $19 million contract with the U.S. Navy to provide hardware maintenance for the Navy's CAE DOS systems. Carl J. Madsen, federal contract manager of Prime's Federal Support Group, said, "We anticipate the award of other contracts from the government."

Computervision has had the foresight to round out its CAD strategy by establishing the Personal CAD/CAM business unit, a separate entity within Computervision devoted to designing and marketing Personal Designer, Personal Machinist and Versacad software for the MS-DOS and Unix workstation environment.

Small by comparison

The combined Prime/Computervision team is left, like peers in other markets, to chip away at a market led by IBM and other smaller vendors



Total worldwide $6.8 billion

Source: Daratech, Inc. CW Chart: Paul Mock

According to Al Fernandes, former CAD/CAM manager at Orthomet, Inc., his company has been using Personal Machinist since its debut in 1985.

"Our industry relies on a lot of curves, arcs and blending shapes. We also need 3-D capabilities," Fernandes said. "We looked at other packages, but at the time, [Computervision] had the only 3-D surface modeling package for the PC platform."

While Computervision will probably never push Autocad off of its personal computer CAD pedestal, it has certainly established itself as a viable player in the PC CAD world, with 20,000 individual seats for Personal Designer and 80,000 Versacad seats installed to date.

And for the future, it is a pretty safe bet that the company will gather more users under the newer Sun platforms and increase business with the next release of Medusa.

A 1990 CAD/CAM/CAE revenue forecast from Daratech, Inc. shows that Prime/Computervision is expected to capture 12.1% of the market, edged out by IBM with 30.7% and Integraph Corp. in Huntsville, Ala., which placed second with a 14.9% prediction.

Kleinman

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plier, who is familiar with the applications or operating systems support requirements. Internal staffs know more about their own computing environment, and vendors know more about specific applications or operating systems. However, research shows that customers expect — and get — *a lot more* from internal staff members than from outside vendors.

The high dependence on internal staffs explains why almost half of the customers' 1990 and projected 1992 software budgets are allocated to personnel costs. This includes supporting internal operations, applications development and internal software maintenance. The remaining dollars are left to be split among outside services (e.g., software support, training and education and consulting) and software acquisition.

According to Ledgeway's recent survey of 600 IS managers, internal staffs generally outperform outside support vendors. On the average, a user of mini/mainframe software receives a response to a question or problem from his or her internal staff in one to two hours. Problems are typically resolved in two to three hours, and between 72% and 74% of all issues are resolved on the first call. In comparison, outside support vendors respond in two to three hours, take three to four hours to resolve a problem and only resolve 62% to 64% of issues on the first call.

How critical is the difference of an hour? Well, it may not be important to someone wanting to know if a feature is going to be added to the next revision of software. But ask someone trying to understand why the mainframe just crashed, and the difference between one hour and two hours becomes clear.

Knowing this, the challenge is now twofold.

- Users should apply internal benchmarks to evaluate vendor support offerings. By doing so, they will have a stronger basis for critiquing vendor performance and become better consumers of software support.
- At the same time, vendors need to step up to the challenge of performing at a level consistent with internal staffs. By doing so, vendors will generate increased customer satisfaction and, hopefully, loyalty.

In defense of vendors, remember that they cannot be expected to know the customers' computing environment as well as the staff.

Internal resources are also preferred when it comes to performing a variety of "professional services" projects. Rather than turning immediately to an outside vendor, customers initially give consideration to their internal staffs for help with systems planning and design, applications development, systems integration and facilities management projects. Only for training, education and migration services do systems vendors rank higher than internal staffs; while multiservice firms such as Computer Sciences Corp. or EDS are the strongest candidates for multivendor service.

The challenge for both parties is to identify ways to work together effectively. Managers should learn from their own staff and use the standards they set to evaluate and select vendor support. And vendors must remember that while customer support issues tend to be low on the list of selection criteria when choosing a software application, it jumps to a prominent level of importance when making repurchase decisions. Besides, what better way to ensure top-notch support than to let your vendor know you are watching?

Kleinman is manager of the software support program at The Ledgeway Group in Lexington, Mass.

Parallan blurs mini/microcomputer line

BY JIM NASH
CW STAFF

MOUNTAIN VIEW, Calif. — The line between microcomputing and minicomputing is getting fuzzier than "ohpntz" at the bottom of an eye chart.

Parallan Computer, Inc. recently said it is shipping a line of multiprocessing servers that offers the same data integrity and error-correcting memory capabilities found on minicomputers. Server 290 runs OS/2 LAN Manager, DOS and Microsoft Corp.'s Windows applications.

With the introduction, Parallan enters a growing fray to give networks the reliability of minis. Already in the fight are Compaq Computer Corp. with its Systempro and Netframe Systems, Inc. with the NF400.

"We're enthusiastic about this," said Dennis McEvoy, president of Cooperative Solutions, Inc., a start-up software firm in San Jose, Calif. McEvoy said his firm has conducted beta tests for the past month on Parallan's Server 290 15 to 20 million instructions per second Model 20, with two Intel Corp. I486-based 33-MHz processors and one small computer systems interface. The Model 20 has 32M bytes of memory and four 676M-byte hard disk drives.

Developing OLTP tools

McEvoy said he is using the Parallan system to develop and test Cooperative Solutions' own online transaction processing (OLTP) software. He said he is evaluating the standards-based Server 290 for possible internal administrative use in the future. The multiple processors, he explained, allow him to store database applications, such as Sybase, Inc.'s SQL Server, on one processor and his local-area network operating system on the other processor. His software could run such a machine.

Parallan's low-end five-processor Server 290 Model 10 carries a base price of $50,000. The company's high-end server, the Model 60, sports eight processors and has a list price of $250,000 installed.

Gianluca Rattazzi, president of Parallan, stressed the fault tolerance inherent in the system, which mimics Tandem Computers, Inc.'s mirroring nature.

Steve Madigan, senior program manager in Microsoft's Networks Division, said support for the system should be made easier given Server 290's open architecture. "When a service person opens it up, it looks exactly like an IBM [Personal System/2], something almost everyone is familiar with."

He said Microsoft may pick up one of the systems for its dual-processor abilities, putting SQL on one and file management on the other.

Printer intros continue

BY JAMES CONNOLLY
CW STAFF

TUSTIN, Calif. — The recent wave of high-end nonimpact printer introductions rolled on last week when Siemens Information Systems, Inc. announced the successors to its laser printers, a pair of LED-based printing systems for use with IBM mainframes and other hosts.

The Siemens introduction of the 2140 and the 2090 came less than a month after IBM replaced its decade-old 3800 laser printer with the 3900 and Xerox Corp. announced its next-generation laser printer family, the Docutech series, in early October.

Siemens, which will continue to market its older, laser-based 2300 and 2200 printers, claimed no speed advantages over IBM but, rather, promoted what it said was the superior print quality of the LED engine and the 17-in. paper width. Martin Ginger, manager of product marketing for Siemens' Peripheral Systems Division, claimed the new Siemens printers produce images comparable to those offered by desktop nonimpact printers.

A beta user of the 135 page/min. 2140 praised the product's print quality. Paul LaFlamme, data processing manager at Scanforms, Inc., a direct-mail house in Bristol, Pa., said the printer eliminates the ragged edges found in laser printers.

However, of equal importance to LaFlamme is the 17-in. printing surface, four inches wider than other companies use offer. "Knowing that we have a 17-in. print area we can run some two-up or side-by-side forms, although being a direct-mail house we have some customers who will want to use the full 17 inches."

LaFlamme's shop has had the 2140 connected to Scanforms' two IBM 4341 Model 2 hosts since August. He said "minor glitches" have been typical of those found in a beta test and that Siemens has corrected such problems as excessive heat and misalignment of rollers.

The printers are available now and designed to be plug-compatible with IBM mainframes. They are also intended for use with IBM Application System/400 and Digital Equipment Corp. minicomputers, Unisys Corp. mainframes and IBM Token-Ring networks.

Base models of the 2140 and the 2090 are priced at $198,000 and $148,000.

VMS

FROM PAGE 25

ise of system support, which the VMS folks cannot offer today.

The question that DEC officials refuse to answer is how they plan to pull this off.

"DEC is trying to put as much Unix functionality and Unix system calls into the VMS kernel as possible," said Kevin Oberman, network manager for the engineering division at Lawrence Livermore Laboratories in Livermore, Calif. "I would presume they're going to build some separate command language interpreter into the VMS kernel."

At Lawrence Livermore, VMS is gradually losing ground to Unix applications, mainly because of the superior performance of the reduced instruction set computing (RISC) machines that run them, Oberman said.

DEC said it hopes to remedy that situation by altering the heart of the VAX architecture with the introduction of RISC technology into the CPU, now based solely on complex instruction set computing (CISC). But that process will take the firm at least three years to accomplish.

In the meantime, DEC will be trumpeting its open systems strategy of application portability through compliance to industry standards developed under Posix, the X/Open Portability Guide and the Open Software Foundation. The short-term benefits of Posix compliance, however, are virtually nil.

"You can't really tell yet what Posix compliance buys you, because no one is writing applications to Posix interfaces yet," cautioned Dave Card, an analyst at International Data Corp. in Framingham, Mass. "Old Unix applications will not run on VMS boxes, nor will old VMS run on the Unix boxes. DEC is hoping that Posix and XPG will be a rich enough set of interfaces so developers will write real programs to those interfaces."

Tall task

One of the tallest technical hurdles DEC faces in running Unix applications under VMS is the vastly different way Unix and VMS handle "process creation," Oberman noted. While Unix can spin off so-called "lightweight" processes as easily as a duck shaking off water, the same maneuver under VMS would drown the machine.

A process in the Unix world is actually a program or thread of execution, and a lightweight process is one that requires minimum CPU and memory use. Examples of processes could include running a word processor or creating an electronic-mail routing system.

"Under VMS, creating a process is a very heavy-duty operation that involves tremendous amounts of resources," Oberman said. "But the entire Unix philosophy is that you fork off new processes at the drop of a hat."

One point DEC customers and analysts agreed on is that the company has no choice but to embrace Unix as wholeheartedly as it can stomach.

"Our top-level people are deciding they don't want to be locked in or beaten over the head by a vendor or proprietary operating system," said Derek Haining, a systems programmer in the University Computing Services at the University of Washington in Seattle. "Even if VMS is superior to [University of California at Berkeley] Unix, they want to go with Unix."

"The fact that DEC is considering opening up VMS and truly treating Unix as a coequal operating system environment, is an important shift for them," added Kevin O'Neill, vice-president of research at Business Research Group in Newton, Mass. "Like it, love it or hate it — Unix is a reality as the most pervasively available operating system across the widest array of platforms."

NEW PRODUCTS — SOFTWARE

System software

Compuware Corp. has announced Playback/File Extension, a file simulation feature that has been added to Compuware Playback 5.0, its mainframe software automated testing tool.

The tool enables users to capture transactions and related file activities in an application test procedure and then make them available during re-execution in subsequent test scenarios, the vendor said.

The product also supports on-line applications running under VTAM.

Prices range from $27,000 to $93,000, based on CPU size.

Compuware
31440 Northwestern Highway
Farmington Hills, Mich. 48333
(313) 737-7300

Applications packages

Jyacc, Inc. has announced Version 5.0 of its JYACC Application Manager (JAM), a software package that enables developers to prototype and deliver applications that can be ported to other platforms or transferred to other databases.

The product provides an application development environment that requires a minimal amount of third-generation language.

JAM runs on most major platforms, including Digital Equipment Corp. VAX/VMS and VAX/Ultrix systems, MS-DOS-based machines and Amdahl Corp. mainframes. Pricing ranges from $395 to $38,820, depending on type of platform.

JYACC
116 John St.
New York, N.Y. 10038
(212) 267-7722

Trax Softworks, Inc. has introduced its latest version of Edword, word processing software designed for mainframes.

Edword Version 3.0 can be customized to operate with current mainframe software packages to create reporting systems, letter-writing systems and communication facilities.

The software runs on VM/CMS, TSO, CICS and Roscoe operating systems. Pricing ranges from $6,200 to $23,370, depending on CPU size.

Trax Softworks, Inc.
5840 Uplander Way
Culver City, Calif. 90230
(213) 649-5800

Development tools

Cognos Corp. has announced an application development software package designed for Release 6.09 of Hewlett-Packard Co.'s HP MPE/XL system.

Powerhouse 6.09 includes a screen painter and Powerhouse Quick, an on-line interactive debugger. The product also provides users with read and write access to all HP environments, according to the company.

Pricing ranges from $17,600 to $213,000, depending on configuration.

Cognos
67 S. Bedford St.
Burlington, Mass. 01803
(800) 426-4667

Languages

AT&T Unix Systems Laboratories, Inc. has announced a set of C++ tools designed to complement its C++ Standard Library.

Release 1 of the C++ Standard Library Extension was designed to facilitate the building of commercial-quality application programs. It includes source code for AT&T's 3B2 minicomputer running Unix System V, Release 3.0 or higher. The product can also be ported to other Unix platforms, the vendor said.

Pricing is $5,000 for the initial CPU and $2,500 for each additional CPU.

AT&T Unix System Laboratories
P.O. Box 25000
Greensboro, N.C. 27420
(800) 828-8649

NEW PRODUCTS — HARDWARE

Processors

NCR Corp. has added an enhanced processor memory controller to its NCR Tower 32/500 and Tower 32/700 systems.

Version VI of NCR's Processor Memory Controller enables users of Tower 32/500s and 32/700s to integrate a Motorola, Inc. 25-MHz 68040 microprocessor into their systems.

According to the vendor, the upgrade provides twice the processing performance of an NCR Tower 32/700.

The upgrade kit costs $4,000 for the Tower 32/700 and $7,500 for the Tower 32/500.

NCR
1334 S. Patterson Blvd.
Dayton, Ohio 45479
(800) 225-5627

I/O devices

Interaction Systems, Inc. has announced a serial touch-screen controller designed for its line of capacitive touch screens.

The 5002 controller is packaged as two 2.5- by 5.5-in. piggyback boards. Features include a +5-volt input power, X-Y resolution of 512 by 512 pixels and support for transmission rates of 300 bit/sec. to 19.2K bit/sec.

Pricing for 14-in. units starts at $395 and $620, depending on quantity purchased.

Interaction Systems
86 Coolidge Ave.
Watertown, Mass. 02172
(617) 923-2112

Aamazing Technologies Corp. has introduced a 14-in. analog multisynchronous color monitor that provides 1,024- by 768-pixel resolution and more than 256 simultaneous colors.

Model CM-61428 is compatible with IBM Video Graphics Array (VGA), Super VGA and 8514/A standards. Its horizontal scan frequency ranges from 31.5 to 38 KHz, and its vertical scan frequency ranges from 45Hz to 90Hz.

The product costs $639.

Aamazing Technologies
5980 Lakeshore Drive
Cypress, Calif. 90630
(714) 826-9680

Northwest Digital Systems has introduced its NDS X Station Models XT.15 and XT.19 of monochrome X Windows display stations.

The products feature 1,024- by 800-pixel resolution at a 76Hz refresh rate and terminal memory that can be expanded to 10M bytes. They are available in 15- and 19-in. versions. The XT.15 is costs $2,295 and the XT.19 costs $2,495.

Northwest Digital Systems
P. O. Box 15288
Seattle, Wash. 98115
(206) 524-0014

Ten of Europe's toughest critics awarded Wyse their top prize.

Over 3 million even tougher critics awarded us their business.

Hannover, Germany, 1990: European experts judging at CeBIT, the world's largest computer exposition, give their top design award to the Wyse PC Model 3225.

No big surprise. Wyse design has been winning over computer professionals for nearly a decade. It's won, in fact, an installed base of more than 3,000,000 terminals and PCs. Because Wyse design is also a wise investment. It delivers more features, styling and ergonomics than the competition. For less money. Witness, for example, the Wyse family of Novell-certified personal computers. The CeBIT award winner, our Model 3225, is a 25 MHz 386 that gives you more MIPS for your money than Compaq's DeskPro 386/25 or IBM's PS/2 Model 70. It's very likely the most cost effective server or CAD/CAM workstation you'll find anywhere. Likewise, our 3016SX at 16 MHz outperforms Compaq's DeskPro 386S and IBM's PS/2 Model 55. Expandable to 16MB of RAM, it's the best SX value around for the demanding user. For entry level users who plan to grow, our Model 2012i at 12 MHz 286 desktop offers 7 expansion slots, 4 drive bays, and up to 16MB RAM. It's the most expandable PC in its price range. All these Wyse systems include MS-DOS 3.3 at no extra charge. To learn more about their winning ways, call 1-800-438-9973.

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COMMENTARY

Patricia Keefe

Lotus DBMS: MIA or DOA?

Lotus DBMS: Dump big mistake soon? Lotus, Sun and Sybase recently busied themselves wining and dining the press in a bid to talk up 1-2-3 for Sun and the Datalens/Sybase link — all of which brings to mind Lotus DBMS, first announced in 1987. At this point, given Lotus' relationship with Sybase, that project is probably dead, but Lotus has never come out and said so. In fact, it never says anything about it anymore.

Meanwhile, Lotus reportedly trimmed between 40 and 70 staffers out of the DBMS group, deploying their talents elsewhere. At least one database consultant thinks a shift in focus is good. "They think the whole world looks at a database through a spreadsheet! How ridiculous. I haven't touched a spreadsheet in five years," he said, noting that the same can be said for many of his clients.

In 1991, the Lotus flower may bear fruit. On the Apple front, one Lotus executive tells us that he has 1-2-3 for the Macintosh in his office and it's looking pretty good. You won't see it in 1990, but plan on the first half of 1991 if first-quarter beta testing goes well, Lotus

Continued on page 40

Claris looks to pump up

Apple unit focuses on building onto low end

BY JAMES DALY
CW STAFF

SANTA CLARA, Calif. — Like a gangly teenager on the verge of bulking up into full adulthood, Claris Corp. is preparing to strengthen its array of entry-level Apple Computer, Inc. Macintosh products in the upcoming months as it moves into its role as a permanent Apple subsidiary.

The push for more muscular versions of its popular low-end applications should neatly mesh with the stepped-up wooing of the business market by Apple, which stunned the Macintosh software development community in July when it announced that long-standing plans to turn the $80 million software unit into a separate business had been scrapped. Analysts said they expected Claris to go public later this year.

"We're looking at the second wave of Claris," said Steve Ruddock, a spokesman for the 3-year-old firm, which produces graphics (Macdraw), word processing (Macwrite), database management (Filemaker) and computer-aided design (Claris CAD) packages. "We were always known as a provider of low-end Mac packages, but I think

Continued on page 44

Plotting a course

Will Claris ever develop for the DOS world? "It's certainly not a priority," company spokesman Steve Ruddock said. "But I won't rule it out. If an application would help sell more [Apple Computer, Inc. Macintoshes] in a multiplatform environment, then we certainly will consider it."

One area where Claris will not venture in the near future, Ruddock said, is multimedia applications, because the firm is focusing on higher volume products.

Clearly, the dust still needs to settle before the exact direction of Claris can be determined — a plan to develop a version of Informix Software, Inc.'s Wingz graphic spreadsheet for the Macintosh has stalled. In January, Claris acquired the right to the Wingz technology, but so far nothing has resulted from the union, and Claris officials warned users not to hold their breath.

Observers said such delays should be be expected; Claris may often get wrapped up in a holding pattern until Apple is clear on setting its own corporate direction.

Inventor yields copy-protection scheme

BY JOHANNA AMBROSIO
CW STAFF

Software pirates, beware. A new invention might forever foil you from making unauthorized copies of personal computer packages.

This scheme overcomes the traditional problems of most other types of copy-protection mechanisms, according to inventor Drew Logan, an independent consultant in Haverford, Pa. It permits information systems professionals to make as many copies as they want, while at the same time allowing the software vendor to keep track of how many copies are made and charge users accordingly.

Although two vendors are currently evaluating the idea, Logan said, neither has yet committed to implementing it.

The invention is based on mathematical algorithms that are hidden inside the software. Every time an IS staffer copies a package, he keeps track of the order in which he makes the copy. To initialize the copy, he boots up the copy and types in the serial numbers of the PC and the original software disk.

Then he calls the vendor and receives an "activation" number, which he also types in. The software compares that number with a series of numbers that are already inside the program. If the comparison matches, the person can keep using the copy.

A new activation number is required for each copy made. Once an activation number is used, it cannot be reused to make additional copies. This prevents people from using the same number to make illegal copies, Logan said.

"You can make 9 million copies if you want to," he said. "You just can't use any of them until you get and type in the activation number."

User workout

Although Logan conceded this scheme requires some work from users, he maintained "it is no different from what they already do. Every time you make a copy of something, you're supposed to call the vendor and register it, but I don't know very many people who do that."

He also agreed it would require more record keeping by vendors. "They'd need a database to keep track of the numbers. It may seem like a lot of work, but it's really not. Plus, it would have paybacks like showing the vendors who is buying their software and what they're using it for," Logan said.

Observers said that although the idea seems intriguing and technically feasible, it has some obvious drawbacks. "MIS will accept something that controls copy protection, but they will not accept anything that requires more work on their part," said Michael Millikin, vice-president at Patricia Seybold's Office Computing Group in Boston.

"The scheme that seems to be far more practical is a network license server that keeps track of how many copies are out there. It works and doesn't add an additional burden onto MIS," Millikin said.

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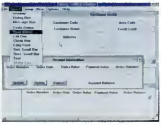

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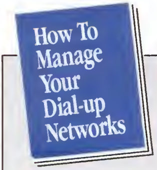

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Toss the old, create the new

ON SITE

BY J. A. SAVAGE
CW STAFF

MOFFETT FIELD, Calif. — Writing software for immensely complicated technical applications is hard enough, but Thomas Lasinski, chief of numerical aerodynamic simulation at the National Aeronautics and Space Administration, suggests throwing it out every three years and writing it anew.

Luckily, throwing out the old and keeping up with the new is in Lasinski's job description. The simulation program, begun this year with the acquisition of Silicon Graphics, Inc. 320 and 340 VGX computers in June, is charged with "providing a testbed environment for new, emerging technologies," according to a NASA statement.

Lasinski's old fluid dynamics visualization software was not yet three years old, so when Lasinski got new Silicon Graphics 370 Iris workstations in June, he ported "lots" of software to the new models. Still, he advises users to keep lean and efficient by writing to new algorithms and new computers whenever possible.

"It's an issue of competitiveness," he said. "As newer technology comes out, you see you can do it faster." Lasinski also added that despite the problem of sunken costs, the pressure to change can be economically justified.

Few standards

While this smacks of blasphemy to commercial users, in the world of three-dimensional graphics (image plus shading plus movement), there are few standards to write to even if they do share some version of the Unix operating system. Thus, old software may have little in common with the latest hardware.

"In 2-D, there are sets of standards," Lasinski said. He added that 3-D graphics vendors find themselves in the position of wanting to support standards, but the technology is changing too rapidly.

Silicon Graphics has applications packages, but NASA is not interested. "The problem with packaged software is that it's geared too much toward glossy, high-quality rendering, and what we're concerned with is the research," said Creon Levit, a research scientist.

Lasinski described his mission: "We make mistakes so industry doesn't have to." The fluid dynamic software his organization develops tracks the flow of air over model aircraft — instead of going to the expense of using the enormous wind tunnels that surround Lasinski's NASA office.

Andy Freeberg

NASA's Lasinski *has ported lots of software to new models*

The developed software is then offered to private companies such as The Boeing Co. and Northrop Corp. to assist in space and aircraft design. "Typically, NASA will do the complicated algorithms to see if they work first," Lasinski said.

The $32 million simulation project is not in trouble with budget cuts, according to Lasinski. In its first phase, about 30 Silicon Graphics workstations were set up at Moffett Field and two other remote sites (in Virginia and Ohio). At this point, they are "basically stand-alone" with a couple servers to offload some of the work. However, Lasinski configured the workstations with I/O processors so they can later be hooked up to the organization's Cray Research, Inc. supercomputers.

Pre-Comdex announcements barrage the marketplace

BY RICHARD PASTORE
CW STAFF

A plethora of pre-Comdex announcements have bombarded potential users in the past two weeks, with new product choices ranging from high-end multiprocessor systems to low-end laptops.

In the emerging megaprocessor arena, Arche Technologies, Inc. in Fremont, Calif., announced a symmetrical multiprocessor system that supports up to 32 Intel Corp. 80386 or 33-MHz I486 microprocessors.

The Arche MP will support Extended Industry Standard Architecture (EISA) peripherals and features 18 expansion slots, 128K to 1,024K bytes of disk cache and up to 1G byte of system memory. Pricing will be announced at Comdex next month. The product is expected to ship by the second quarter of 1991.

Although it is not a multiprocessor box, Advanced Logic Research, Inc.'s latest I486 system distinguishes itself with low pricing. With 1M byte of memory, a floppy drive, the EISA bus and no hard disk, the Businessveisa 486/33 Model 101 sells for just under $4,000.

Only a few firms have yet to announce notebook-class portables based on the Intel 80386SX chip, but there is no shortage of SX portable introductions in weightier configurations.

Hyundai Electronics America in San Jose, Calif., unveiled its Super-LT5 earlier this month, an 11.6-pound unit based on the 16-MHz 386SX. With 2M bytes of memory, backlit IBM Video Graphics Array (VGA) graphics and a 40M-byte hard disk, the unit retails for $3,995.

Fora, Inc., also in San Jose, unveiled its own SX laptop, this one based on the 20-MHz version of the chip. The 15-pound unit comes configured with 1M byte of system memory, two expansion slots, VGA graphics, a floppy drive and a 40M-byte hard disk. The unit costs $4,499; a 16-MHz model costs $3,999.

Still room for 286

Although the 386SX seems to be the new standard platform for vendors to aspire to, there are still Intel 80286-based units coming down the pike for users with less sophisticated processing requirements.

Montreal's Ogivar Technologies, Inc. earlier this month added its own 286 notebook personal computer to the ranks. Unlike most 286s, the Internote 286 offers VGA graphics with 32 shades of gray. It also includes a 20M-byte hard disk, a floppy drive and 1M byte of memory and costs $3,000.

Peripherals makers are also warming up for Comdex. Okidata in Mount Laurel, N.J., announced a 4 page/min LED nonimpact printer priced under $1,000. The introduction bests Okidata's previous low-end price/performance by 15% to 30%, according to the company.

Maxell Corp. of America introduced a write-once read-many optical disc with a total capacity of 7G bytes. The 12-in. disc is designed to operate with Hitachi Data Systems Corp.'s newly released OD-321 optical drive. The discs are slated to ship in the first quarter of 1991.

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Windows 3.0 breaks through DOS barriers

Technology Analysis is a roundup of expert opinions about major new products.

BY SUZANNE WEIXEL
SPECIAL TO CW

Surrounded by hype, lost in comparisons with OS/2 and Unix, Microsoft Corp.'s Windows 3.0 might be the most misunderstood graphical DOS shell ever released.

Windows is not an operating system, but reviewers at the major personal computer laboratories and publications have often treated it as if it were, knocking the product for failing to provide the multithreading and true multitasking capabilities that OS/2 and Unix deliver, largely because Windows 3.0 offers comparable interface and operating features.

Viewed simply as a graphical user interface that brings effective windowing and point-and-shoot-capability to IBM-compatible systems, Windows fares much better, winning praises with few reservations from the reviewers.

Despite the limitations imposed by DOS, Windows' most significant feature is its memory management. Windows makes use of the protected mode of Intel Corp. 80286, 80386 and I486-based systems to provide access to extra memory.

This capability should result in faster performance, but the majority of applications available for use with Windows do not make use of protected mode. Unless you are using Windows 3.0-specific applications, you will realize little improvement in speed over earlier versions.

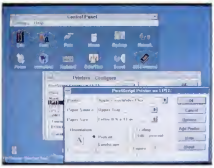
Optimal performance with 386

If you expect to get any value out of Windows memory management, most reviewers said you should not even bother running it on a 286-based system. *PC Week* likens running Windows on a 286 to a "leisurely stroll."

This requirement can raise the price significantly. Windows 3.0's list price is $149, and upgrades for registered users of previous versions cost $50. But achieving optimal performance requires a 386-based PC with 2M bytes of RAM; a hard disk drive; a monitor with IBM Video Graphics Array, Color Graphics Adapter or compatible video graphics adapter; and MS-DOS or PC-DOS 3.1 or higher. The minimum investment, assuming that none of these pieces is already in place, is $2,000 plus.

Visually, Windows 3.0 delivers a clean, professional interface, which reviewers find comparable to Presentation Manager and Motif. Features that make the program look nice also make it easier to use. Reviewers at *PC World* said the consistent use of icons reduces learning time.

In short, reviewers see Windows 3.0 as a vast improvement over previous versions. However, because it lacks full multitasking capabilities, Windows is not seen as a strong choice for the long term when compared with OS/2 and Unix.



Windows 3.0 brings *effective point-and-shoot capability to DOS*

Healthy returns

- **One million Windows 3.0 units sold since May 22 release.**
- **Microsoft profits: $275 million — a 60% increase.**
- **Windows 3.0 predicted 1991 sales: $415 million.**
- **Company & product sales (one - poor, ten - excellent): Terence Quinn, Kidder Peabody-9; Rick Sherlund, Goldman Sachs-10; Charlotte Walker, Labe Simpson-10.**

PRODUCT: Windows 3.0 SCORE: 80

Points	Category	Methodology*
21	Reviews	Average of available numeric scores from reviews multiplied by a factor of 3
15	Analysts	Average of 1-to-10 rating from five product analysts multiplied by a factor of 2
13	Users	Average of 1-to-10 rating from five major users multiplied by a factor of 1.5
16	Costs	Average of users' and analysts' rating of cost to get product up and running multiplied by a factor of 2
15	Financials	Average of 1-to-10 rating from three analysts on health of company and product sales; factor: 1.5
80 *(Maximum score: 100)*	**The 1-to-10 scale: 1 equals poor, and 10 equals excellent. Maximum points per category: Reviews – 30; Analysts – 20; Users – 15; Costs – 20; Financials – 15 (See detailed ratings below)*	

CW Charts: Paul Mock

REVIEWS SUMMARY

Criteria	PC Week	Infoworld	PC World	PC Magazine
	8/13/90	9/24/90	7/90	9/11/90
Ease of use	5	Very good	A breeze to use	Easy to customize
File manager	NC	NC	Could be better integrated	Too awkward
Memory manager	7	Very good	Powerful	Full-fledged environment
Multitasking	7	Good	Pleasant surprises	NC
DOS compatibility	NC	Very good	Poinless	Fewer limitations
New applications	8	NC	Many on the way	Explosion of products
Documentation	5	Very good	Concise and clear	NC
Reviewer's score	6.4	7.4	NC	NC

Ratings are based on a scale of 0 to 10; 10 is the best. Numbers reflect weighted scores used by each publication. Only PC Week and Infoworld scores are included in chart (above). These are excerpts of the reviews. Refer to actual articles for details. NC: No comment

Microsoft response

Comments from Microsoft's Rich Abel, Windows Group Product Manager

System requirements
Microsoft's position is that regardless of platform, users gain something with Windows 3.0. The best performance is on a 386-based system, but at minimum the product acts as a task-switcher. Also, users gain a graphical user interface for DOS.

File Manager
Microsoft plans to revamp the File Manager, but Abel says, before condemning it as awkward and confusing, consider its predecessor, the MS-DOS Executive.

Signs of adoption
Microsoft believes people are committing to Windows 3.0 for the long term. Signs of success include: sales volume, independent user groups and the large number of Windows 3.0-compatible products.

Productivity worth the price

Five users at large scale installations and five software analysts evaluated Microsoft Corp.'s Windows 3.0 on a scale of one to 10 (one being poor and 10 being excellent) in terms of the overall product and cost. Users: Dale Smith, General Electric Co. (8 overall, 10 cost); George Stromberg, Textron (8,10); Steve Birgfeld, Martin Marietta Corp. (8,6); Ted Savas, Cox Enterprises (8,9); a manager at a large bank in the Midwest (10,8); Analysts: Andrew Seybold, Dataquest (7,8); Jeffrey Tarter, Softletter (8,8); Dan Ness, Computer Intelligence (8,6); David Cearley, Gartner Group (6,7); Amy Wohl, Wohl Associates (8,8).

"We don't simply have Windows 3.0 to run multiple DOS applications. It's our chosen architecture, which should tell you something about how we feel about it. It's not cheap, and you don't want to set this up on the cheap. You want the right system, memory and applications."
Steven Morse, *Senior Technical Officer, Wholesale Banking Unit, Manufacturers Hanover Trust*

"It is an insignificant amount of money for a significant improvement in the operating environment. It makes a graphical user interface available to DOS. That's what we've all been waiting for, and that's what users are buying. They are not buying it for the performance or the applications."
Amy Wohl, *Wohl Associates, Inc.*

"We're experiencing a 30% increase in throughput. Before Windows 3.0, we always had to stop one program and start another. Now we can just cut and paste."
Steve Birgfeld, *Manager of Computing Standards Product Evaluation Center, Martin Marietta Corp.*

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CONTINUED FROM PAGE 35

sources say.

Keep those upgrade cards and letters coming. Since 1-2-3 for Windows won't be out until 1991 — again, the second quarter is most likely — Lotus has a lot riding on upgrades to Release 3.1.

The firm has been open about the disappointing sales of Release 3.0, which lacked the desktop publishing features available under Release 2.2. It is hoping to move the vast base of Release 2.0 and 2.2 users forward, however, to Release 3.1, which fixes that glaring error and has the added bonus of running under Windows.

This effort is backed by a gargantuan direct-mail campaign, heavy advertising and a faster turnaround time on upgrades.

Lotus has already issued a release touting strong initial sales through the channel, quoting resellers who quickly sold out their stock and citing account wins at Firemen's Fund Mortgage, Amoco and American Cyanamid. But it's still early.

Consider that users know 1-2-3/W could be six months away. Note also the rain of upgrades inundating the user community these days and the fact that many micro managers prefer to have major upgrades spaced 12 months apart.

Moreover, more sites than not are not networked. Unlike their networked brethren, stand-alone users are usually given the choice of whether to upgrade. And the bigger the shop, the more likely these users will not be forced to upgrade.

Tie all those factors together and Release 3.1 could suffer the same snub that befell 3.0. Only time, of course, will tell.

Run that by me again? One of the more amusing junctures in the ongoing battle between Nynex and attorney and whistle-blower Scott Rafferty — who worked a while back at Nynex's Telco Research subsidiary — involves phone logs. Testimony from Rafferty and other Nynex whistle-blowers has figured in eight legal actions against the increasingly defensive regional holding company.

In his own suit against Nynex for wrongful discharge, Rafferty won a court order to give him access to those logs. But his access was limited because Nynex officials in Nashville and New York claimed to have *lost* most of the firm's phone records.

"Now this is the subsidiary that makes the station message detail recorders to keep phone records for private branch exchanges," Rafferty exclaimed. "I believe that like I believe Rosemary Woods."

Still, Rafferty had the last laugh. He used Lotus Symphony to sort Nynex' phone logs in order to create a map of who was where when. That map pointed "toward all kinds of contradictions" in testimony.

Symphony also came in handy when sorting electronic mail messages to and from specific Nynex executives into a giant spreadsheet. These were then sorted by date and matched up to hard-copy documents provided by Nynex. This helped to find documents Rafferty wasn't given, forcing a reopening of the discovery process. "This happens once in a blue moon," he said.

Perhaps it didn't fly. First Lotus copyright attorney Hank Gutman scoffs at what he alleged was to be Mosaic Software's defense against copyright infringement charges, namely insisting that they are the "only people in the universe Lotus gave license to clone 1-2-3." The next thing we hear, the trial is postponed from Oct. 25 to Nov. 20 because Mosaic has hired a new attorney to try its case.

Also on the copyright front, Charles Taylor, an analyst at Prudential Bache Securities, offered a new twist on an old slogan. Pointing to the "innovate, don't litigate," favorite of groups like the League for Programming Freedom, Taylor offers the following less catchy, but possibly more pointed, response: "Innovate, don't copy."

Keefe is *Computerworld's* senior editor, PCs and workstations.

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No Go on pen-based box

BY JAMES DALY
CW STAFF

FOSTER CITY, Calif. — In a surprising reversal, Go Corp. has shelved plans to produce a commercially available pen-based computer and instead will concentrate on developing the operating system software that drives the notepad-size machines.

At a July press conference in which Go announced it was licensing the still-unreleased software to IBM, President Jerry Kaplan broadly suggested that both companies would produce commercial machines that use an electronic stylus instead of a keyboard. The decision to pare down their corporate mission will have no effect on the IBM agreement, a Go official said.

Some industry observers had predicted that the 3-year-old firm would use next month's Comdex/Fall '90 trade show as a pulpit to unveil a computer based on the new technology.

Although several prototypes of the lightweight handheld boxes had been built, a Go spokeswoman said they were used only to test the operating system software. "We've always been a software company not a hardware company," said spokeswoman Carol Broadbent, who added that Go would like to replicate Microsoft Corp.'s approach of widely licensing its operating system to establish a de facto industry standard.

Some analysts have conjectured that pen-based computers could affect the industry unlike anything since Apple Computer, Inc.'s Macintosh, with users ranging from insurance adjusters visiting the scene of an accident to store clerks taking inventory. Firms such as Fremont, Calif.-based Grid Systems Corp., as well as Sony Corp. and Canon, Inc. of Japan already have commercially available systems.

Stacking up on real-time

BY SALLY CUSACK
CW STAFF

CARLSBAD, Calif. — Stac Electronics, a 7-year-old company that specializes in personal computer data compression products, unveiled a real-time compression product for DOS-based systems at Data Show '90 in Tokyo.

Stacker is available in three configurations: software for laptop, notebook-size and IBM Micro Channel Architecture-based computers; an add-in board for IBM Personal Computer, XTs, ATs and compatibles; and in coprocessors, so that computer manufacturers may incorporate the technology into new systems.

Offering a reported compression ratio of 2:1, Stacker is said to allow users to double their Winchester disk storage capacity without adding a hard disk.

"The Stac algorithm works on any PC file," said Gary Clow, Stac's president. "There are no limitations, and real-time compression can even be applied to previously compressed graphics."

The 30K-byte program can be loaded into high memory using a memory manager utility, and according to Stac, can be installed in less than five minutes. Actual compression on the hard disk can occur at speeds up to 20M bytes per minute.

Stacker runs under Microsoft Corp.'s Windows 3.0 and is said to be compatible with all versions of MS- and PC-DOS 3.0 or higher, including Compaq Computer Corp.'s DOS 3.31.

The software-only version costs $129. Both the software and coprocessor card are priced at $229.

Claris

FROM PAGE 35

you're going to see that change over the next 12 to 18 months."

Users said they welcome the evolution. "Claris has a great product, but it can sometimes be a little wimpy," said Ken Wells, a project engineer and Claris CAD application user at Design Engineering Services, Inc. in San Francisco. "If they could marry their ease of use with a more sophisticated product, they'd have a real winner."

That transformation began in September when Apple shifted full possession and responsibility for its popular Hypercard program — as well as a handful of software engineers — over to Claris. The move, Ruddock said, would allow a more intense feature enhancement effort to be focused on Hypercard.

Other moves include the recent introduction of the more powerful Filemaker Pro, which replaces the aging Filemaker 2.0 package. Networking development has also been moved over to Claris, Ruddock said, although Apple will retain control of Appleshare network development until at least the introduction of System 7.0, which should arrive by the middle of next year.

Claris seems unlikely to make an immediate assault on the DOS marketplace. Just before Apple announced its decision to retain Claris, Apple top management reportedly began to worry that Claris could focus future development efforts on competitive programs such as Microsoft Corp.'s Windows Version 3.0, which gives a Macintosh-like interface to IBM Personal Computers and compatibles. "It would have killed [Apple Chief Executive Officer John] Sculley to see Claris jump on the 3.0 bandwagon," said Charles Rothschild, an analyst at the research firm Pershing & Co.

Claris officials acknowledged that any move to develop a non-Macintosh application begins with several strikes against it. "Obviously, we would have moved in some directions because they made good business sense," Ruddock said. "But now we have to consider whether it makes good strategic sense for Apple."

NEW PRODUCTS

Software applications packages

Softsource has announced that its Standard, Professional and Junior versions of Drawing Librarian have been enhanced to work with Release 11 of Autodesk, Inc.'s Autocad software package.

The upgraded product features display, print, plot and translation capabilities that are completely functional with Release 11 of Autocad.

Current users of Drawing Librarian can upgrade their systems for $25. Retail pricing is $500 for Drawing Librarian Professional, $250 for Drawing Librarian Standard and $125 for Drawing Librarian Junior.

Softsource
301 W. Holly
Bellingham, Wash. 98225
(206) 676-0999

Geovision, Inc. has announced a desktop mapping system based on compact disc/read-only memory and designed for use in Microsoft Corp.'s Windows 3.0 environments.

Windows/On the World operates in conjunction with the Geodisc U.S. Atlas CD/ROM, a software package based on a Digital Line Graph database developed by the U.S. Geological Survey to provide users with interactive mapping capabilities and a transportable geographic database for use with other applications.

The products are individually priced at $495 or as a package for $595.

Geovision
5680 Peachtree Pkwy.
Norcross, Ga. 30092
(404) 448-8224

Intermec Corp. has announced enhancements to Shopscan, its modular software system designed for work-in-progress tracking, labor data collection, material tracking and time and attendance applications.

Shopscan Version 3.0 is a shop-floor reporting system that collects data through bar-code devices and validates, organizes and reports in real time all activities that occur on a manufacturing shop floor. The product runs on IBM Personal Computer XTs, ATs or compatibles, Personal System/2s and local-area networks.

Pricing begins at $4,000.

Intermec
6001 36th Ave. W.
Everett, Wash. 98203
(206) 348-2600

Knowledgeset Corp. has introduced a version of its Graphic Knowledge Retrieval System that was designed for Microsoft Corp.'s Windows 3.0 running under DOS.

The product features full-text capabilities, hypertext links that accelerate navigation through data and multiple window viewing. It also enables users to access vector and raster images and display multiple fonts and point sizes in database text.

The Windows 3.0 version is scheduled to be available in the first quarter of 1991. Prices start at $75 per copy.

Knowledgeset
888 Villa St.
Mountain View, Calif.
94041
(415) 968-9888

Jandel Scientific has announced a software package designed for researchers who need to separate and analyze multiple overlapping peaks or functional forms.

Peakfit was developed to assist scientists and engineers to observe and manipulate peak placement and parameter values graphically on-screen, thereby ensuring fast, accurate convergence, according to the vendor. Other features include pull-down menus, mouse support and the ability to operate in a Microsoft Corp. Windows environment.

The product runs on IBM Personal Computer XTs, ATs, Personal System/2s and compatibles and is available for $595.

Jandel Scientific
65 Koch Road
Corte Madera, Calif. 94925
(800) 874-1888

Software utilities

Ajida Technologies, Inc. has introduced Release 2.5 of Plotview, a utility program that lets users view, print, cut and paste Hewlett-Packard Co. Graphics Language format plot files.

The product was designed for Versions 2.1 and 3.0 of Microsoft Corp.'s Windows. It enables users to examine and manipulate graphics that were created in drawing, paint or computer-aided design and manufacturing programs and then saved as plot files.

Plotview is priced at $99 for domestic versions and $129 for international versions.

Ajida Technologies
613 Fourth St.
Santa Rosa, Calif. 95404
(707) 545-7777

Peripherals

In Focus Systems, Inc. has announced a portable presentation manager designed to help users organize, enhance and present computer-generated images.

Liteshow II is compatible with applications created using DOS, OS/2, Microsoft Corp.'s Windows 3.0 and Apple Computer, Inc. Macintosh operating systems. A grab function captures computer images and stores them on a 3½-in. diskette, and a special-effects generator enables users to enhance and manipulate these images.

The product is priced at $1,995.

In Focus Systems
7770 S.W. Mohawk St.
Tualatin, Ore. 97062
(800) 327-7231

Mass Microsystems, Inc. has introduced Easyvideo 8, a National Television System Committee (NTSC) video output card designed for Apple Computer, Inc. Macintosh II systems.

The 8-bit Nubus card fits into a single slot of any Macintosh II machine. It can simultaneously display 256 colors as a standard NTSC composite video signal and allows users to view presentations or animations prior to recording, the vendor said.

Easyvideo 8 is priced at $599.

Mass Microsystems
810 W. Maude Ave.
Sunnyvale, Calif. 94086
(408) 522-1200

Nisca, Inc. has introduced an 8-bit handheld scanner designed to reproduce 256 shades of gray within a Microsoft Corp. Windows 3.0 environment.

Niscan/GS can be used to capture gray-scale images through hardware controls rather than software interpolation.

System requirements include an IBM Personal Computer AT or Personal System/2. The product is priced at $399.

Nisca
1919 Old Denton Road
Carrollton, Texas 75006
(214) 242-9696

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From an interview with John Good
of The Turner Corporation.

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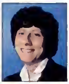
NETWORKING

COMMENTARY

Elisabeth Horwitt

Hidden price, odd strategy



It's not so much the 200% extra that some companies will have to pay for the new version of Netview; it's the way IBM snuck those price increases in under the rug that passes the bounds of good taste and good judgment.

Netview Version 2 was part of the introduction avalanche that IBM let loose last September. IBM Vice-President Ellen Hancock and her gang had plenty to say about the functional significance of Version 2, such as its support of a direct LU6.2 interface and its enhanced command structure for managing LANs.

However, no one mentioned Netview 2 prices at the press conference — at least within my hearing. OK, we didn't expect IBM spokesmen to jump up on the podium and trumpet the news of a major price jump. IBM always tucks away the subtler and less positive aspects of its announcements in the middle of customer letters, for reporters to take home and chew like baffled bulldogs.

Apparently, however, IBM neglected to make its pricing strategy clear to key customers and consultants who cater to such key customers. That's not just rude, it's stupid.

Mind you, there are plenty of precedents for IBM announcing a major price boost with a new version of a strategic product. Some analysts even claim that IBM may actually have been

Continued on page 56

Store chain may banish Banyan

BY JOANIE M. WEXLER
CW STAFF

HAYWARD, Calif. — Like a hippie turned stockbroker, Mervyn's department store may find itself migrating back to The Establishment — meaning, of course, IBM.

Mervyn's, a clothing and housewares chain that spans 20 states, said it will probably swap out its Banyan Systems, Inc. Virtual Network System (Vines) networks in favor of IBM's LAN Server, which is based on the multitasking OS/2 operating system. One reason for the proposed change is that the company wants to hook up with a business partner that will provide full-time network planning, design and technical support.

The conversion, which will depend on results of a LAN Server pilot slated to run from December through March, would involve moving key corporate data on 30 local-area networks serving nearly 500 users, according to the company. The firm uses the Banyan networks for resource sharing and local processing but stores corporate resources on an IBM 3090 mainframe, which it will retain.

"We need more support than the vendor is willing or able to give, and there is a lack of applications available for the Vines network operating system," said Conrad Spielman, Mervyn's information center consultant.

Spielman added that Mervyn's felt the need to partner with a vendor able to provide a spectrum of consulting services. He acknowledged, however, that he does not think other local-area networking companies, such as Novell, Inc. and Microsoft Corp., are structured any better than Banyan to provide the extensive partnership arrangement the retailer requires.

Craig Buchanan

Mervyn's *considers switch to IBM LAN Server*

In addition, Spielman said, Mervyn's is attempting to minimize the number of vendors it deals with — aiming to pare down to just IBM and AT&T (for telecommunications services).

Technology planner Christopher Joyce added that the increased expense of doing business with IBM "should be offset by better support and fewer application integration headaches."

Increasing the number of LAN applications available while reducing in-house integration is a top goal, Joyce said.

"Generally, end users have to integrate applications for Vines themselves, and Mervyn's is lagging behind in decision support applications. We figure that right now there isn't anyone out there not writing applications for LAN Server."

The Vines-to-LAN Server migration could be eased by Banyan's alliance with Microsoft to develop software that will allow interoperability between Vines and LAN Manager, Microsoft's network operating system on which LAN Server is based.

Spielman said Mervyn's made

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ISDN: Connecting U.S. to overseas

BY ELISABETH HORWITT
CW STAFF

NEW YORK — While local U.S. carriers are still a long way from linking their "ISDN islands" across the U.S., they have begun providing users with switched connections to overseas Integrated Services Digital Network services.

At the recent Communications Managers Association '90 conference, Teleport Communications Group and France Telecom demonstrated an "end-to-end switched ISDN connection" that should become commercially available sometime next year, the carriers said.

Users within Teleport and France Telecom CMA booths demonstrated how ICL North America desktop conferencing systems in the U.S. and France could exchange data and update the same file over an ISDN link. However, since standards do not yet exist for intelligent ISDN connections between two carrier switches, AT&T's Switched Digital Service was used to provide a 64K bit/sec. connection between Teleport's AT&T 5ESS ISDN switch and France Telecom's ISDN network.

Pacific Bell now offers a commercial version of this type of link in which the carrier's Centrex ISDN users can dial out to switched services such as AT&T's Switched Digital Service offering — and from there to users on other carriers' ISDN services, both in the U.S. and overseas. Ricoh Corp. now uses such links to send facsimiles and establish videoconferences with sites here and abroad.

Overseas links

A number of business companies that have begun evaluating domestic ISDN services are now eyeing the possibility of extending those links overseas. Ricoh, for example, now uses Pacific Bell's ISDN Centrex service to dial out to an AT&T switched 56K bit/sec. link to other offices both in the U.S. and in overseas countries, according to company spokesman John Zebrowski.

Manufacturers Hanover Corp. has been talking to New York Telephone about becoming a pilot for the local carrier's ISDN service, said Pat Molloy, network manager at Manufacturers Hanover's Global Banking Technology Division. The bank is considering using ISDN to provide up-to-date product and market data to customers and internal users, he added. The firm makes use of a Reuters Holdings PLC service to distribute this information, Molloy said.

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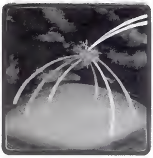

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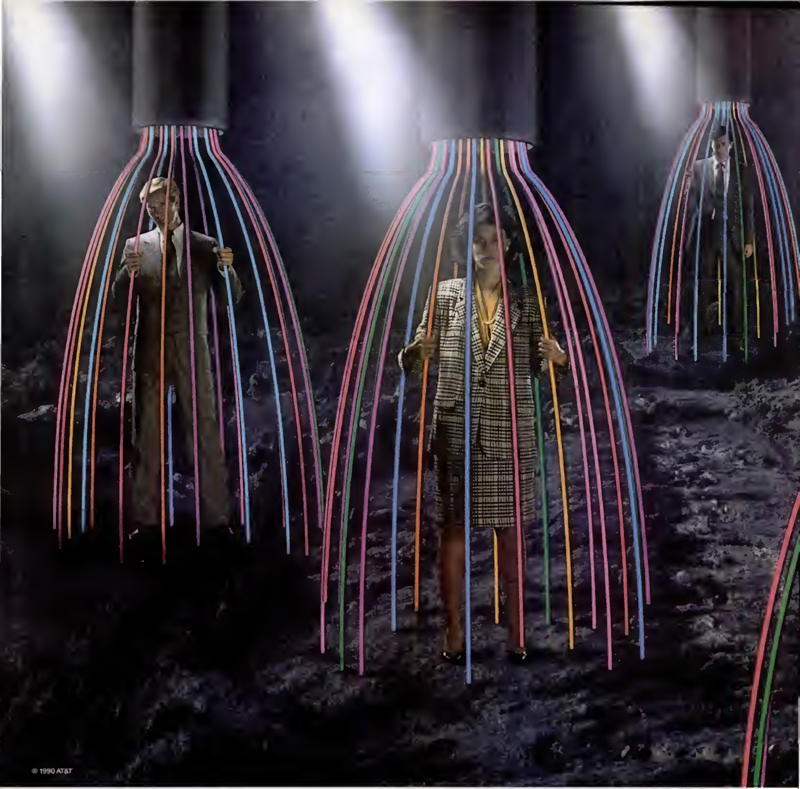

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Help on way for APPC users

Object-oriented development tool could make life easier for programmers

BY PATRICIA KEEFE
CW STAFF

MOODUS, Conn. — Microformatic, Inc. USA, along with its Paris-based parent company, Microformatic, SA, recently introduced the first object-oriented development tool for OS/2 users of IBM's Advanced Program-to-Program Communications (APPC).

This has become an issue because OS/2 Extended Edition's Communications Manager provides APPC under OS/2.

Developed in part at the urging of IBM France, APPC++ cuts programmer training and development time by hiding much of IBM's complex communications environment behind objects. "It's a bear to use. A few commands involve 10 to 15 lines of code," said Stefan Kent, director of sales and marketing at Microformatic USA.

"The idea is that you can use [APPC], but you don't have to understand it. Using the product is like opening and closing a file," claimed Jean-Jaques Fouchet, Microformatic, SA's president.

"We're saying it reduces development time from several weeks to a few minutes and that the ramp-up time is almost zero vs. having to learn and configure APPC. It all depends on whether you have Com Manager or [Microsoft Corp.'s] Communications Select Workstation properly installed, which is no simple feat," Kent claimed.

Programmers see APPC++ as a regular call to a normal function, just as if they were programming in the regular C language. They can invoke one of two library classes: A simple class allows the user to send and/or receive in APPC; an expanded class provides access to more, but a still reduced set of APPC verbs, Kent said. "This lets the programmer worry about the application he or she is trying to develop and not worry about the mechanics of [APPC]," he added.

Embedded verbs

A lot of the APPC verbs are embedded in an object, which the programmer can use to kick off the application.

Conceding that it is very difficult to develop in APPC, Michel Granger, an OS/2 marketing manager at IBM France in Paris, said people in IBM [France] wanted to present customers with an APPC applications development tool. Ironically, IBM's efforts to simplify the number of APPC's verbs only complicated matters for programmers, Fouchet said.

The APPC Development Group at IBM Raleigh was working on a similar product when it caught wind of APPC++, according to Kent. It is now evaluating the product.

"John Walker of IBM USA, who is also known as the 'Pope of APPC,' is very interested in the product," Kent said. Various IBM USA laboratories are said to be evaluating the product and, in some cases, using it internally.

According to Fouchet and Granger, many large French financial institutions and travel systems have committed to OS/2. Fouchet said many of these firms began their migrations last year.

Banc Nationale de Paris, for example, purchased more than 10,000 units of OS/2. The Amadeus reservation consortium bought 55,000 units of OS/2. But OS/2 is especially hot among banks and insurers, which began to replace terminals with OS/2 workstations last year. "APPC++ is very useful for doing cooperative processing between the workstation and the host system," Granger said.

At the same time, there is a lot of support for the C++ language.

APPC++ was introduced in France in July and in the U.S. in October. So far, Fouchet has four French customers. In general, APPC++ is being used to get data back and forth between the host and desktops scattered throughout branch offices. There is one U.S. beta-test site.

Banyan and CC:Mail branch out into E-mail

BY JIM NASH
CW STAFF

SAN FRANCISCO — Banyan Systems, Inc. and CC:Mail, Inc. recently said they will deliver an electronic mail application next year that will allow network administrators to consolidate their combined user directories.

Short of rudimentary messaging services of their own, the major local-area networking companies have been noticeably absent from the E-mail arena.

Banyan's decision to work with Mountain View, Calif.-based CC:Mail to develop CC:Mail for Virtual Networking Software (Vines) will produce the first bundling of such communications tools.

Banyan has an X.400 messaging protocol interface now, and according to Dave Mahoney, president and chief executive officer of Banyan, the new product does not rule out a Banyan-X.400 product in the future.

The lack of E-mail is especially curious given that many personal computer users are coaxed into using LANs by the promise of E-mail connections, said Chris Lyon, a systems analyst at the University of California at San Diego.

The university's business affairs department, he said, has standardized on CC:Mail and Novell, Inc.'s Netware network operating system. Similar packages with Novell and Microsoft Corp. would lower administrative overhead, Lyon said.

With the new product, a manager of Banyan's Vines network operating system will be able to consolidate the Streettalk global directory database with CC:Mail's user directory. This simplifies the task of finding and electronically contacting users.

Ben Finnegan, information center analyst at Hayward, Calif.-based Mervyn's department stores (see story page 49), said the announcement "definitely piques our interest." He said CC:Mail for Vines is unlikely to answer the debate, but it does give Banyan a unique advantage.

Testing an alternative

The chain has been testing Consumer Software, Inc.'s Network Courier messaging product as an alternative to Streettalk's more basic messaging service. The collaboration, along with CC:Mail's compatibility with Microsoft's Windows, gives CC:Mail an advantage should Mervyn's decide to stay with Westboro, Mass.-based Banyan, Finnegan said.

Banyan's and CC:Mail's move "sure makes a lot of sense," said Mike Heylin, an analyst at Creative Stategies in Santa Clara, Calif. The move will pull Banyan's appeal into the middle market, expanding its overall market share from the Fortune 500, Heylin said. "Banyan has a lot of tenacity."

It is CC:Mail, however, that stands to gain more from the partnership, according to Heylin. CC:Mail gets access to a loyal and growing installed base.

A study by Dataquest, Inc., a market research firm in San Jose, Calif., indicated that CC:Mail holds fully one-third of the DOS E-mail market in terms of mailboxes, said Connie Duncan, a Dataquest analyst.

INTERNATIONAL BITS

Infonet acquires interest in Paris firm

Infonet, the international value-added network service provider, has acquired a majority ownership interest in **OSIware International**, a Paris-based company that offers Open Systems Interconnect-compatible software. Infonet plans to use OSIware's CCITT-compliant X.400 products to enhance its own X.400-based Notice 400 electronic mail family, the company said. It also plans to use OSIware's expertise to develop other standards-based messaging products and services, such as CCITT X.500-compliant directory offerings.

Halliburton Company, which provides diversified oil field services worldwide, has signed a $1.4 million order for more than 30 videoconferencing systems from **Picturetel Corp.** The systems will be used to link employees at Halliburton facilities throughout the U.S. and overseas. They will also be used to link Halliburton with its customers worldwide. Halliburton hopes the videoconferencing systems will help accelerate decision-making and problem resolution while reducing travel time and expense.

Western Union Telegraph Co. has signed an agreement to interconnect its electronic mail service with Sweden's TEDE400/Telebox service via the CCITT X.400 E-mail standard.

General Electric Information Services has announced the installation of a GEIS network node in East Berlin, as well as plans to install network nodes in three other cities in Germany — Dresden, Leipzig and Chemnitz — by year's end. The new nodes will allow German users to directly access GEIS' international value-added network.

Banyan

FROM PAGE 49

a transition from a centralized terminal-to-mainframe setup established in the mid-1970s to local-area networking in June 1989 because "the quality of the mainframe is still what it was 20 years ago. There's a five-year backlog for writing mainframe applications, while there are thousands of applications out there for PCs."

Banyan was chosen "because it is the easiest LAN to set up, administer and network with other systems," Joyce said. However, Mervyn's has turned to Syntrex, Inc. — a Banyan reseller — to fill in the Banyan support gap and for some of Syntrex's Vines-certified servers.

Mervyn's plans to put OS/2 on several desktops in addition to many of its servers, citing such upcoming applications needs as multimedia in-store training and accessing multiple mainframe resources simultaneously as justification for widely installing the multitasking operating system.

Joyce emphasized that IBM is going to have to prove itself before the Vines-to-LAN Server conversion is approved. "IBM itself doesn't understand LAN Server all that well yet," he said, "and OS/2 and [IBM's network management system] Netview are not very user-friendly. We'll have to see if IBM comes through with the support and product development we need."

Spielman added that if the IBM pilot was unsuccessful, Mervyn's would turn to other "standards-based" platforms, such as Microsoft's LAN Manager and 3Com Corp.'s 3+Open.

Banyan declined to comment on Mervyn's possible switch to another vendor. However, one Banyan customer, Jonathan Oski, senior technical engineer in the Boston office of Bank of Tokyo Financial Corp., said, "We've been a Vines user since 1984 and have always felt we've been in partnership with them."

Oski said the bank attempted to transition about 10 nodes of its 1,500-node Vines network to OS/2 LAN Server earlier this year for a vertical market application that the firm needed to quickly implement.

"IBM couldn't get the product going," said Oski, adding that because the system kept crashing, the company swapped out the LAN Server network for a 3+Open network, which is also LAN Manager-based.

"There is nothing our users are demanding that we can't deliver with Banyan," Oski said, although he acknowledged that his company has strong in-house network expertise. In addition, he said, "there are a lot of resellers better equipped than Banyan to field network problems, since Banyan is getting away from direct customer relationships."

Copyrighted material

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NETWARE SOLVES ISSUES AT

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But open connectivity is only one consideration. After all, the EPA can't afford to test the waters with an unreliable network. So they use the only PC-based network operating system that's in its eighth generation. According to Stoneman, "We use NetWare for its reliability, advanced capabilities and functionality. It's easy to maintain, and we are very pleased with the security that NetWare provides."

In addition to sharing information and accessing several host systems, the EPA tracks cleanup efforts and communicates through E-mail over its NetWare network. All of which make for a very productive office environment. In fact, Stoneman attributes some significant cost savings to NetWare, "We no longer need a laser printer on every desk or 12,000 copies of dBase, Lotus and WordPerfect."

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NOVELL

The Past, Present, and Future of Network Computing.

Prodigy suspends vocal E-mail price critics

BY ELLIS BOOKER
CW STAFF

WHITE PLAINS, N.Y. — The battle between Prodigy Services Co. and the Cooperative Defense Committee escalated last week when Prodigy suspended without explanation the accounts of several electronic mail activists who had recently begun a mailing campaign to Prodigy advertisers and other subscribers.

The vocal group of Prodigy users wants the videotex provider to back off on its plan, announced in early September, to end unlimited free E-mail on the service sometime next year.

"It's bait-and-switch advertising," declared the group's coordinator, Russ Singer, who pointed to Prodigy's promotional material, which still declares that Prodigy is a "flat rate" service. He said his group has compiled a database of 15,000 Prodigy user identifications from customers who also oppose the rate change.

Prodigy posted a message in its Feedback section stating that further discussion regarding the E-mail pricing change would not be allowed on the bulletin board and that messages regarding the controversy would be returned

Geoffrey Moore, director of market programs and communications for Prodigy said of the suspended accounts that Prodigy routinely terminates the accounts of users who violate policies. He said the "repeatedly and increasingly strident harangues" of a small number of customers had generated complaints from other subscribers.

Moore also said that Prodigy has no objection to users complaining but that hundreds and thousands of messages sent by a small number of people had been "flooding mailboxes," and this amounted to harassment.

The E-mail group said it is considering legal action in the wake of the terminations.

Analyst Karen Nielsen at Link Resources Corp. in New York noted that information networks are private services and that providers are within their rights to restrict messages. "This is not a public network; it's a private one."

Horwitt

FROM PAGE 49

charging far too little for Netview, given the flood of enhancements and capabilities it has added in the past couple of years.

IBM may have even done its smaller competitors a backhanded favor by bringing its prices more in line with the cost of developing a major network management platform. Until now, all but the most determined have been discouraged from entering the network management platform market because if they charge prices comparable to Netview's, they will never recoup their initial investments.

In addition to handing off a bit more of IBM's research and development costs onto customers, however, Netview Version 2 represents a major development in IBM's pricing policies. First, it introduces additional intermediate pricing levels that are tied to specific model types. Thus, the cost of a Netview installation reflects much more accurately the size of the host Netview runs on.

Second, pricing is now differentiated by whether a Netview host is stand-alone, distributed or central. Stand-alone Netview hosts are just what they sound like. Distributed Netview systems can act both as local nodes that manage a particular segment of the network, and as liaisons that pass the information they have collected up to a central Netview host. The central Netview is a focal point that collects and coordinates information from multiple distributed Netview hosts.

Netview Version 2 costs a lot more for central hosts than it does for distributed hosts. This has led at least one IS manager to conclude that IBM is pressuring its users to set up a more hierarchical enterprisewide Netview installation.

Trouble is, IBM hasn't come out and said what it means by its pricing strategy. And there are certain Netview configurations where it is very hard to tell exactly what label to tack onto a Netview host. If two Netview systems talk regularly in peer-to-peer fashion, are both central? How subordinate does one host have to be to earn the name "distributed"? What functions does Netview Version 2 offer on a central host that are lacking on a distributed system?

IBM has said it will answer these questions for its customers on a one-on-one basis. During their first post-announcement visits, however, some IBM sales reps seemed to be almost as mystified about the new pricing regime as the users were. One IS manager said his reps could give little help in figuring out what the new version would cost his company and left him as baffled as ever as to the nature of his systems: distributed, central or stand-alone.

Presumably, some of IBM's most valued customers are getting straight answers by now. One manager went through an arduous spreadsheet analysis and figured out that his firm would probably pay 116% more for the new version. Then IBM reps took his figures, did some calculations and told him, no, the number was more like 65%.

The unlucky ones are IS managers who have yet to get hold of a knowledgeable IBM sales rep but need at least a general idea of how much the new Version 2 enhancements would cost their companies, so they can put together their pitch to management. Some of these users may be asking themselves, as one manager apparently is, whether they should take at least some of their network management eggs out of the Netview basket and put them into a LAN-based product — or even System Center's Net/Master.

Horwitt is a *Computerworld* senior editor, networking.

NEW PRODUCTS

Local-area networking hardware

Telco Systems Network Access Corp.'s Fastlane four-to-one compression bridge was designed to link local- and wide-area networks over a T1 network.

The product supports link speeds that range from 4.8K to 64K bit/sec., thereby quadrupling effective throughput rates, the vendor said. Its Adaptive High-Density Compression algorithm enables Fastlane to learn data stream characteristics and yield a compression of more than six to one for several applications.

Fastlane is scheduled to begin shipping next month at an initial price of $8,500.

Telco Systems
48430 Milmont Drive
Fremont, Calif. 94537
(415) 490-3111

Cabletron Systems, Inc. has announced a 4M and 16M bit/sec. IEEE 802.5 line of token-ring products.

The family includes Desktop Network Interface cards designed for IBM Personal Computer XTs, ATs, Micro Channel Architecture-based PCs and Apple Computer, Inc. Macintosh II machines; six connectivity Media Interface Modules for its Multi Media Access Center intelligent wiring hub; management modules for local and remote network management; and a stand-alone concentrator with ring-in/ring-out ports.

Pricing ranges from $735 to $8,000, depending on type of product, options purchased and port configuration.

Cabletron Systems
35 Industrial Way
Rochester, N.H. 03867
(603) 332-9400

Network management

Packet/PC, Inc. has announced a software package designed to automatically distribute, install and retrieve personal computer programs and data files for local and remote PCs.

Synchrony Version 2.0 enables firms to send and install files on an unlimited number of designated PCs in attended or unattended mode and then automatically retrieve files, reports and on-line data.

Pricing is $30,000 for the first mainframe license and $75 to $195 for PC software packages, depending on quantity.

Packet/PC
270 Farmington Ave.
Farmington, Conn. 06032
(203) 678-1961

Gateways/ Bridges/ Routers

Network Systems Corp. has announced a dual-attached Fiber Distributed Data Interface (FDDI)-to-T3 router that permits 100M bit/sec. networks to be connected over wide-area links to other networks operating at 1.5M to 44M bit/sec. full-duplex speeds.

The FE648 includes complete Simple Network Management Protocol agent software for standard network management capabilities.

The product is priced at $50,000 for one T3 and one dual-attached FDDI connection.

Network Systems
7600 Boone Ave. N.
Minneapolis, Minn. 55428
(612) 424-4888

BICC Data Networks, Inc. has enhanced its product line for its Isolan Etherconnect System for local-area networks.

The 1201-3 STP system, which includes a shielded twisted-pair repeater line card, is priced at $1,595, and the 1182 STP transceiver, costs $195. Both provide Etherconnect Systems with shielded twisted-pair wiring schemes, according to the company.

BICC Data Networks
1800 W. Park Drive
Westboro, Mass. 01581
(508) 898-2422

ISDN

FROM PAGE 49

"European ISDN activity is of interest to us, but we don't know how it fits our needs yet," Molloy said. "We have an X.25 international network, and it all works — we don't experience any shocks now. We are waiting to see how solid ISDN products are."

Citicorp hopes to begin a limited deployment of an ISDN network by year's end that will eventually include both domestic and overseas connections, said David Isherwood, a vice-president at the bank holding company. [CW, Oct. 29].

Among recent overseas ISDN developments are these:

- Teleport, an alternative access carrier that provides fiber-based metropolitan-area networks in New York and other cities, is planning to make a "controlled market introduction of Centrex plus international ISDN services" this quarter in New York, Teleport spokesman Baldwin said. General availability is slated for first-quarter 1991.
- British Telecom PLC hopes to offer switched links between its own ISDN services and U.S. ISDN services by spring. The company is considering a link to Teleport, primarily as a way to provide ISDN to its major customer, Merrill Lynch & Co., British Telecom spokesman Nigel Taylor said. Merrill Lynch owns a stake in Teleport and is rumored to be considering entry into an ISDN pilot that was initiated by the New York Public Service Commission.
- International Telecom Japan, Inc. plans to offer ISDN services both within Japan and to the U.S. by the middle of next year, a spokesman said.
- France Telecom plans to roll out its switched ISDN links to the U.S. sometime in the first half of next year, with a limited rollout to customers late this year, according to Gabriel Sidhom, director of marketing for the overseas carrier.

One reason that regional carriers are behind when it comes to offering true ISDN connections to long-distance carriers is regulatory hurdles to offering out-of-band signaling, according to Pacific Bell spokeswoman Ella Spradley. In a true end-to-end ISDN network, a separate D channel is allocated for sending network routing, management, and call setup information between carrier switches.

Without that capability, carrier networks must reserve a portion of each user circuit to send such information, leaving users with 56K bit/sec. instead of 64K bit/sec. to send voice, data and video, Spradley said.

The Federal Communications Commission has yet to approve out-of-band signaling proposals from Pacific Bell and several other regional operating companies, Spradley said.

MANAGER'S JOURNAL

EXECUTIVE TRACK

Mark Rosenthal has been named director of MIS at **Quill Corp.** in Lincolnshire, Ill., a large office products distributor.

He is responsible for systems design and programming, computer operations, records management and telephone systems.

Rosenthal is a former partner at Computer Sciences Corp.'s CSC Partners' office in Oak Brook, Ill., and former vice-president at Planmetrics, Inc. in Chicago. He has also held positions at World Book Encyclopedia and Arthur Andersen & Co.

……

Joseph Brigandi has been named applications development manager at **Wachovia Bank** in Winston-Salem, N.C. He is responsible for developing a trust and investment application at Wachovia.

Brigandi has developed similar systems at two Philadelphia-based banks. He spent the last 11 years at First Pennsylvania Bank, most recently as group leader and an MIS officer.

Before that, Brigandi spent seven years at Fidelity Bank, where he rose to the position of senior systems analyst. He is a graduate of Temple University in Philadelphia.

Brigandi is a former board member of the Association for Systems Management (ASM) and a recipient of the ASM Distinguished Service Award.

……

Patrick Fleming has been promoted to director of **CLC Training Corp.'s Computer Learning Center** in Santa Clara, Calif.

Fleming is a 30-year IS veteran. His past positions have included director of applications programming at Nordstrom's and engineering manager of internal systems at Pacific Northwest Bell.

Before joining CLC, he was vice-president and general manager at Western Computer Group, Inc. in Burlingame, Calif. He joined CLC as lead instructor for the microcomputer specialist program.

Expanding without spreading thin

Jones Day law firm networks its expertise worldwide from home base

BY RICHARD PASTORE
CW STAFF

Some would argue vehemently with the notion that the world revolves around Cleveland. However, Cleveland-based law firm Jones, Day, Reavis & Pogue is deploying a computer strategy to achieve that net result, extending its brain trust to offices across the country and around the world.

Jones Day, the U.S.' second largest law firm, has rightly supposed that such heavyweight corporate clients as General Motors Corp. and Citibank N.A. would not want to come to Cleveland for counsel. Yet at the same time, they expect all Jones Day physical and mental resources to be available at any regional office.

"They don't want to be subject to the capabilities of a few people in a particular office," says William Steinbrink, a Jones Day partner and chairman of the technical services committee.

One level of legal service

With 10 offices from Los Angeles to Atlanta and seven across Europe, the Middle East and Asia, the firm has turned to computer technology to achieve its single-firm philosophy.

"We use technology to support the concept of a single firm providing a single level of legal services," Steinbrink says.

With a network stringing its offices together, a lawyer in the Los Angeles office can instantly tap into extensive database libraries at the Cleveland headquarters. Although too large to reproduce at the various remote offices, the database resources in Cleveland are available to lawyers at all Jones Day locations.

This universal, instant access has allowed Jones Day to achieve its expansion goals without spreading its expertise too thin. Major clients who might otherwise feel nervous doing business with an "extension" of the firm are comforted and impressed by the degree of communication between offices, Steinbrink says.

Bruce Zake

Jones Day's Steinbrink: *Interoffice communication impresses clients*

Jones Day could still achieve its goal of nationwide integration without technology, Steinbrink contends. However, the quickening pace of doing business and the growing expectations of clients are making high-tech techniques more indispensable. "Technology is about the only way to provide these services in a fast-moving environment," he says.

Other law firms have varying degrees of automation, but in general, the profession has been slow to adopt distributed technology, according to observers. Even at Jones Day, which considers itself on the leading edge, there was some early resistance to the system, which has been evolving over several years.

"There has been some resistance,

Continued on page 60

Falling into the leadership gap

BY CLINTON WILDER
CW STAFF

The 1960s are remembered for the Generation Gap. The 1970s had the Credibility Gap. And according to Andersen Consulting, information systems executives in the 1990s are facing the Leadership Gap.

Andersen's biennial study, "The Changing Shape of IS," surveyed 125 IS chiefs in the U.S. and Canada on 17 technology, business strategy and human resources issues. Respondents said that 11 of those issues were very or extremely important but were *not* being effectively dealt with by their company.

The Leadership Gap refers to how much an issue's rated effectiveness lags behind its importance. For example, 88% of the IS executives said it was important to get functional managers involved in using information technology to reshape business processes, but only 30% said their company does it effectively.

Filling the gap

Other issues with a 50% or larger gap between importance and effectiveness were the following:

- Integrating technology into corporate strategy
- Developing corporate IS strategy
- Training workers in the use of IS
- Developing a quick-response capability to handle changing business opportunities
- Improving applications development productivity

Andersen interpreted this Leadership Gap as reinforcing an old message: Top business executives must be involved with IS. "If an organization is to be successful in the 1990s, it cannot compartmentalize the IS function," said Jim Fischer, managing partner at the technical services organization of Chicago-based Andersen. "Senior IS management must be part of corporate strategy planning."

Any good news? A little. Two issues that scored above 80% in importance were also rated as effectively executed by more than half the respondents: communicating with top management and managing information resources such as databases.

BOOK REVIEW

Learning to collaborate and cooperate without hating it

SHARED MINDS: THE NEW TECHNOLOGIES OF COLLABORATION
By Michael Schrage
Random House, $19.95

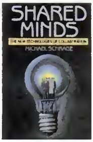
From the days of watching *Sesame Street* on into adulthood, we're told about the value of cooperating and collaborating. Why, then, do smart and eager businessmen despise going to meetings?

In *Shared Minds*, Michael Schrage offers an explanation. Businessmen genuinely want to collaborate, he says, but the technologies at their disposal — pens, paper, whiteboards, even electronic mail — do not encourage collaborative activities.

"We need to gain a deeper insight into what makes tools effective for communities, not just individuals," Schrage says.

Schrage also implies that the search for such new collaborative technologies, valuable as they may be for improving the performance of people and companies, is also demanded by the way we live in the twilight of the 20th century. Consider what happens when the poor collaborative work of a cockpit crew causes a mistake. "The cockpit," Schrage writes, "is thus a microcosm — albeit an unusually dramatic one — of the technological environments we all inhabit."

How we inhabit environments and the way information flows in and out of these "shared spaces" is a vital and well-constructed part of *Shared Minds*. This train of thought produces some of the author's best insights into communication and comprehension, and how both are shaped by technology.



"Each successive generation of technology has fragmented shared understandings further by putting more power in the distribution/transmission process. People are more concerned with presenting their messages within the constraints of the medium than ensuring that the recipient actually understands the message." Better "communicators" aren't enough. The corporation thinks its various parts communicate, when in fact it is a Tower of Babel; marketing can't talk to accounting, and neither can talk to research. A new paradigm — a new set of collaborative tools — is required.

Schrage acknowledges the obvious: Even the most innovative collaborative technology — say, a high-definition, holographic, voice-activated and intelligent conference table — can't accomplish a thing without the right people around it.

Many of the examples of successful collaborations in *Shared Minds* are drawn from the arts and sciences. Certainly, some readers will immediately protest Schrage's selection of people such as Picasso and Braque, the creators of Cubism, as models of the collaborative process. "Hey, these guys were geniuses, and we don't have any geniuses on my management team," the skeptic might say.

Schrage argues that such collaborations "can and should serve as models for people who are working together to create innovations or solutions to problems."

However, Schrage chooses his model collaborators for other reasons as well. He wants to show that the collaborative experience must take place in a "shared space," one in which the participants are free to interact, brainstorm and even play.

Some technology companies are already exploring the possibilities of such shared spaces. Xerox Corp.'s Palo Alto Research Center in California has its Colab, featuring a meeting room with a large "community computer screen" that meeting participants can send symbols to or draw or write on.

No matter what kind of software or hardware resides in these special rooms, the common aspect is their WYSIWIS (what-you-see-is-what-I-see) interface, Schrage states.

Paradoxically, although shared spaces focus on process rather than product, they are extremely productive places in which to work, Schrage says. IBM, he reports, attests that its decision support centers generate over 50% of person-hour savings in meeting time and reduce project completion time by 92%.

The impact, both good and bad, of all this on the traditional ways meetings are held — who has power, who has control — is explored in some depth by Schrage. Unfortunately, it isn't until the final, and apparently rushed, chapter of *Shared Minds* that he gets down to some real-world advice about how to conduct a shared space session and what existing computer technologies today can be used for this purpose.

Shared Minds is long on theory but short on practical advice. To balance, Schrage should have spent more time exploring how people are using existing computer technologies for creating shared space collaborations and less time on speculative, albeit interesting, questions about media, language and society's collaborative future.

ELLIS BOOKER

Booker is *Computerworld*'s Chicago bureau chief.

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3270
Appointment Calendar
File Edit View Globals Help
LETTER. SEND DEVICES.LETTER
File Edit View Locals Globals Help
Technology Committee
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Edit letter...
Send letter...

Dr. Carlton Miller
Executive Director, Information Sys
MS-4632F
Milford, CT

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The substantial investment we've found a better way to integrate into our SAA environment.

McGregor in Accounting says the

Name:
Nickname: Carl
Title: Exec
Division: Info
Mailstop: MS-4
Telephone: 7750
Location: Milford State:

Announcing a Cure for the Terminal Blues

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COMMENTARY

Stephen P. Keider

Avoiding failure

Major systems development projects fail for many reasons. Usually, the reasons provided are technical in nature and rarely reflect upon the management of the project. None of them by themselves are fatal, and each appears, to some degree, in virtually every firm.

Most of the flaws can be corrected through education or counseling. Some cannot, however, and those must be accounted for in the execution of the project.

A fundamental premise, of course, is that a successful project begins with a proposed solution that will, when implemented, provide competitive advantage to the end user. That is, it will result in improved service, greater competitiveness, less cost, more revenue and higher earnings per share.

Assuming that the final application passes this fundamental test, then failure is usually caused by a lack of applying sound management principles to the execution of the project.

These principles can be generally classified into creating the proper culture, providing leadership, planning, organizing properly, , execution, reporting and control.

Hopefully, no major project will experience all of the frustrations outlined in the checklist below. However, if the majority surface in *your* project, it will, indeed, fail.

Culture of the corporation

- A severe penalty for failure exists within the corporation.
- Unrealistic expectations are made by both the user and executive management.
- The project is not supported by adequate resources, whether staff, budget or tools.
- Poor work practices exist.
- Corporate critics attack the project at every opportunity.
- Rivalries exist within the organizations that are attacking the same problem from different viewpoints.
- Overemphasis on "how" vs. "what."
- Implementation of a project that changes the way a company operates.
- Unclear policies.
- The "not invented here" syndrome.
- Project objectives conflict with corporate strategy.
- Hidden agendas.

Leadership

- Inability of project management to motivate staff during stress points of project.
- Lack of executive commitment to the project.
- No sponsor within the executive ranks for the project.

Planning

- An unclear link between the project and the company strategy.
- Inability of the project manager to think abstractly.
- Lack of or incomplete project plan.
- Lack of a clear, definable schedule and milestones.
- Arbitrary scheduling.
- Tasks identified are too long in duration.
- Tasks identified are too short in duration.
- Review times are not included in schedule.
- Lack of a project work breakdown.
- Poor selection of systems platform.
- Lack of estimating standards.
- Lack of development standards.
- Requirement to integrate new project with older systems.

Organization

- No full-time project manager.
- A full-time project manager on his first project.
- Incompetent project manager.
- Use of "worker managers" in key positions.
- Use of "acting managers" in key positions.
- No project administration function.
- A project manager who misunderstands his authority.
- Project not staffed as planned.
- Unclear lines of authority.
- Use of junior personnel in critical areas.
- Attempting to simultaneously provide job fulfillment and achieve superb productivity.
- Lack of delegation.

Execution

- Building development tools concurrent with application development.
- Ignoring reusable code/libraries.
- Treating development as an art, as opposed to a science.
- Drive to "deliver something quickly."
- Moving from global design to development too quickly.
- Providing too many functions in initial release.
- Requirement that the system operate on multiple platforms.
- Different vocabulary between the user and technical staff.
- Myopia regarding availability of resources.
- No prototype or pilot.
- Continual refinement of the system.

Reporting

- No executive reviews of the project.
- Inability to write status reports or to read/interpret a status report.
- Activity-oriented status reports.
- Too much detail in reports, leading to false sense of security.
- Inadequate questioning/challenging.
- Project manager who doesn't know how to run a meeting.
- Too many/few review meetings.
- Lack of a system to track project progress.
- Lack of common sense to balance against reporting.

Control

- No change control or project control mechanism.
- No reaction to major changes in scope, staffing or resources.
- Lack of courage to make difficult decisions.
- Applying solutions before problem is defined.
- Sticking with a project manager who is not doing the job, because the alternatives seem worse.

If it's broke, *fix it now.*

Keider is an independent management consultant and a principal at Keider Associates in Amherst, N.Y.

Jones Day

FROM PAGE 57

but it's disappearing," says Marjorie Pendleton, director of information systems services. "Only a handful of lawyers are left that don't have direct access."

Jones Day made it a point not to force computers on its attorneys, preferring to sit back and let the system speak for itself. Soon, without access to electronic mail and other system features, "the lawyers decided they were missing out on something and were not being as efficient as they could be," Steinbrink says.

The level of automation at Jones Day may also help attract fresh lawyer recruits. "The feedback from the recuiting people is that it has been a distinct advantage" for luring bright new talent, Pendleton says.

However, from a client's perspective, all this automation may not be such a good thing, particularly when sensitive data is involved. Clients have applied "pressure to take extreme steps to ensure security," says Pendleton, who has implemented a combination of store-bought and homegrown security packages on Jones Day's international network.

Although some less sophisticated clients express concern about confidentiality, Steinbrink notes that clients "generally appreciate the way their information is handled."

An X.25 wide-area network links host Wang Laboratories, Inc. VS 10000 minicomputers in Cleveland with smaller Wang minis and about 2,700 IBM-compatible, Intel Corp. 80386SX-based personal computers firmwide.

Attorneys and support personnel use the system to access client databases, litigation histories, word processing documents and electronic mail from any office location.

Over here to over there

Besides bringing the firm's far-flung resources together in the U.S., the network is also a pipeline to Jones Day's overseas operations. "The system allows us to integrate those locations more completely in the firm as a whole; the London office is not out there by itself," Steinbrink says, adding that Jones Day is striving to be ahead of the pack in Europe when restrictions fall in 1992.

The foreign offices have posed surprisingly few problems for Jones Day's IS group. "We haven't found any obstacles that couldn't be overcome," Pendleton says. "We replicate there what's available in every other Jones Day office."

The only location that could not accept the X.25 network standard was Saudi Arabia, where dial-up technology was substituted.

While aggressively expanding its operation in Europe, Jones Day is not allowing its automation docket to stagnate.

The IS group is looking at ways to enhance PC sharing, database handling and the employment of imaging technologies. It is also piloting a specially secured token-ring system that gives dial-in access to portable computers.

Though demand among lawyers for portable computing has grown in the last 12 months at Jones Day, the law profession has not embraced the technology to the high degree of other mobile professions such as accounting.

"The theory is that while working on negotiations at a client site, a lawyer can make changes on the portable and produce a document the next day," Steinbrink says. "But we're not seeing that happen. There is not quite the need for overnight turnaround."

Jones Day's systems have also led to a more intangible benefit: harmony. Because the disparate offices are linked to a shared knowledge base, they are not forced to compete with each other in expertise, Steinbrink notes. "There is a better atmosphere in which to work together. We don't compete, and we feel better about ourselves."

CALENDAR

NOV. 25 - DEC. 1

Conference on Software Maintenance. San Diego, Nov. 26-29 — Contact: Michelle Carbone, IEEE Computer Society, Washington, D.C. (202) 371-1013.

Video Expo. Orlando, Fla., Nov. 26-30 — Contact: Debbie Rotolo, Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Technology Management Forum, Client Serving Computing: The Impact. Cambridge, Mass., Nov. 27-28 — Contact: Forrester Research, Inc., Cambridge, Mass. (617) 497-7090.

Cause '90: Challenges and Opportunities of Information Technology in the '90s. Miami Beach, Fla., Nov. 27-30 — Contact: Cause, Boulder, Colo. (303) 449-4430.

OSI 111: The Interoperability Advantage. Arlington, Va., Nov. 27-30 — Contact: Phillips Publishing, Potomac, Md. (301) 340-2100.

Omni User Annual Technical Conference. Itasca, Ill., Nov. 28 — Contact: The Omni User Association, Chicago, Ill. (312) 470-8787.

Microsoft Multimedia Developers Conference. San Jose, Calif., Nov. 28-29 — Contact: Microsoft Corp., Redmond, Wash. (800) 628-1701.

Global Advanced Manufacturing Solutions. Paris, Nov. 28-30 — Contact: Sharon Sutton, National Computer Graphics Association, Fairfax, Va. (703) 698-9600, ext. 336.

Software Improvement Conference. Washington, D.C., Nov. 29-30 — Contact: EFDPMA, Torrance, Calif. (213) 534-3922.

X Window System Forum. Washington, D.C., Nov. 29-30 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

DEC. 2 - DEC. 8

Executive Information Systems '90. Washington, D.C., Dec. 2-4 — Contact: Peggy Kilburn, The EIS Institute, Newton, Mass. (617) 965-8366.

The Dooley Group Executive Conference. Tempe, Ariz., Dec. 2-5 — Contact: The Dooley Group, Hopkins, Minn. (612) 935-8022.

Globecom '90. San Diego, Dec. 2-5 — Contact: Nomi Feldman, San Diego, Calif. (619) 453-6222.

The New Tools: Computer Graphics for Design/Fall '90. New York, Dec. 2-5 — Contact: The Center for Computer Graphics for Design, Briarcliff Manor, N.Y. (914) 741-2850.

IBM Token-Ring & SNA: Gateways, Bridges and Network Management. San Francisco, Dec. 3-5 — Contact: Ann Kielblock, Kaptronix, Haworth, N.J. (201) 769-4250.

Strategic Issues Conference. Cambridge, Mass., Dec. 3-5 — Contact: Conference Registration Office, Boston, Mass. (800) 843-3263.

Automatic Object Recognition Systems. Los Angeles, Dec. 3-7 — Contact: UCLA Extension, Los Angeles, Calif. (213) S25-1901.

IBM IS Management Conference. Orlando, Fla., Dec. 3-7 — Contact: Gene Bruczkowski, IBM, Chicago, Ill. (312) 245-2121.

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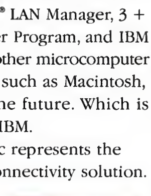

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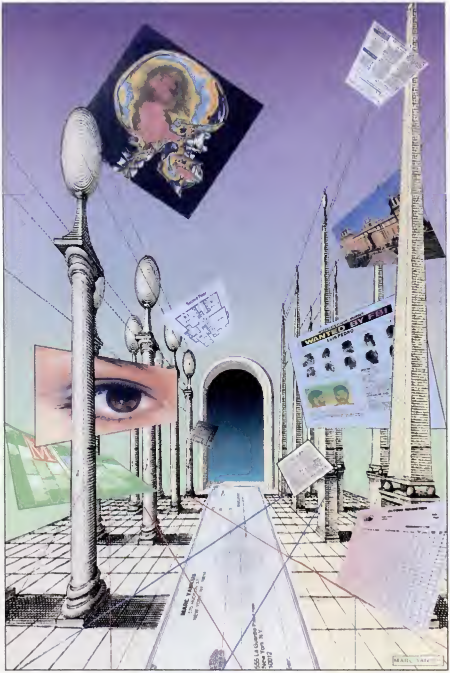
SPECIAL REPORT

IMAGE PROCESSING SYSTEMS

IMAGING *a·n·d* REALITY



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WHAT IT'S ALL ABOUT

Not as new and strange as it seems

by ELLIS BOOKER

Listening to the rising volume of excited voices discussing imaging systems and picking up rag-tag snatches of conversations peppered with unfamiliar technical terms, it is easy to assume that imaging is a brand-new phenomenon that sprang, somehow, full-blown into the middle of the information systems landscape. That conclusion is easy to reach, but it is mostly wrong.

There are some new areas that fit under the umbrella term "imaging," such as machine vision and medical image creation for diagnostic purposes. There are also some exciting new technological developments, relating primarily to electronic publishing, that are referred to as imaging systems. Xerox's new Docutech Series is the most talked-about example.

Most of the discussion and activity, however, centers on something quite different from any of the above. What most people mean when they talk about imaging is electronic document processing, which is not so much a new area as it is a long-standing one that has been rejuvenated by a wave of technical developments. Scanning paper documents and then retrieving them onto a computer screen is by no means new technology. Specialized image storage-and-retrieval applications have been sold for more than 15 years.

"Imaging changes the way you do business because you stop moving paper and start moving data."

Dexter Holt
Federal Reserve Bank

So why all the excitement now?

There are a number of reasons. Within the past two or three years, several important changes have occurred that have turned this slumbering technology into a hot phenomenon.

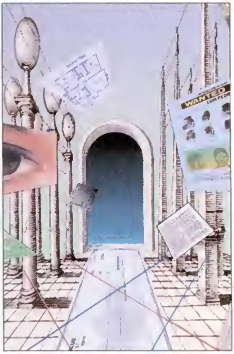
One is that both the price and performance of such component parts as scanners, optical storage systems and the personal computers used to access image databases have started to improve.

Another is the that major computer manufacturers have now endorsed the concept and are entering the imaging game.

Apart from helping to legitimize the technology, the entry of these vendors has provided users with a greater choice of interfaces for linking image applications to their existing data processing operations.

Significantly, many of these vendors are beginning to incorporate imaging into their enterprisewide computing architectures. This September, for example, IBM announced a Systems Application Architecture-compliant version of its Imageplus product family.

Finally, the excitement about imaging has been fueled by an increasing number of success stories (see story page 81).



Marc Yankus

Although the numbers are not overwhelming, there are many organizations that have taken the plunge, and quite a few of the reports they are sending back are very positive. It is not uncommon to hear about increases in transaction volume as high as 30% (with no change in the number of workers) reductions in processing time of up to 50% or a savings in space of even more than that amount.

To understand why some companies — between 1,200 and 1,300 of them, according to market research firm International Data Corp. in Framingham, Mass. — are investing heavily in the technology, contrast the notion that we're living in the "Information Age" with the facts: Only a minute amount — perhaps as little as 2% — of all the "information" handled by companies today exists in digital, computer-manageable forms. The vast untouched remainder — letters, documents, drawings, contracts, shipping information, photos and more — continues to pile up on desks, only to be carted away by the truckload to rows of filing cabinets and micrographics departments.

Imaging technology holds the promise of changing all that.

As Dexter Holt, program manager of check image processing system development at the Federal Reserve Bank in Boston, puts it, "Imaging really changes the way you do business, because you stop moving paper the way you've done in the past, and you start moving data."

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Conversational imagespeak

Attribute data Textual data relating to themes or types of information.

Bilayer A recording structure for disks containing two layers.

Bitmap A way of encoding a digital image using one bit per pixel.

Bitonal An image in which the picture elements have only two intensity values, 1 or 0, which usually stand for black and white.

Boolean capabilities A feature of document indexing software that permits the logical coordination of two or more index search specifications.

Brawsing A system's ability to find an undefined feature or set of features in a database.

Bubble In optical memory, formations created by a laser in an optical recording medium.

Computer-assisted retrieval Allows index information on stored documents to be held in a database. Software can then be used to search for and retrieve the information.

Compact disc A read-only optical disc available in formats for audio, data and other information.

Compact disc/read-only memory A compact disc used only for storage of digital data, usually relatively unchanging data and/or images.

CD-V The compact disc format that combines analog full-motion video images with digital audio.

Compression The process of reducing the number of bytes required for digitized image storage and transmission through elimination of unused white space.

Data density The ratio of text and graphics to white space on a document. The data density determines the amount of optical storage space required.

De-skewing The adjustment made to an image to make up for physical distortions inherent in the system or the adjustment made to an image to compensate for justification errors in scanning.

Digitize The process of representing images as a matrix of binary code, with 0 representing white space and 1 representing nonwhite space.

Document Storage Processor (DSP) A computer consisting of a processor that manages the storage devices of an electronic imaging system. All database transactions are managed by the DSP.

Erasable optical disc A type of read/write optical disc that permits deletion of information

Continued on page 70

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This journey requires special system wardrobe

by THORNTON MAY

Henry David Thoreau counseled his contemporaries to "beware of any enterprises requiring new clothes." Given that advice, it's safe to assume that the Sage of Concord would have been very wary of imaging, because this is an enterprise that requires a totally new wardrobe.

Imaging is not one technology but a collection of different technologies — each at different stages of evolution. The components of an imaging system typically include input devices, storage devices, display devices, output devices, application/work-flow software and communications networks.

Input devices

There are a number of possible entry routes to an imaging system. Scanning is one. Others include optical character recognition (OCR), neural OCR, keyboard, facsimile and output from computer systems, such as electronic data interchange. The optically based input devices and the pattern recognition modules that support indexing/intelligence capture are new to most organizations. That being the case, it is difficult to leverage the purchase of new optical technology with the existing ASCII-based components.

• **Optical scanners.** The most common input device for imaging systems, an optical scanner produces a digitized copy of documents fed through it. Scanners look and function like paper copiers and have very similar market profiles — a few very large domestic suppliers and a plethora of aggressive manufacturers located in the Pacific Basin.

These devices range from small, hand-fed units, which are little more than desktop toys, to industrial-strength, industrial-size information factories. Models are available in a variety of speeds and resolutions. Scanners exist that handle different quality images, from black and white to gray scale and half tones (newspaper quality images) to color and high-quality photographs.

Scanners also come in a range that can accommodate documents of virtually any size, including engineering drawings. Document throughput speeds range from a few pages per minute to over 100 pages per minute.

Duplex scanners can scan information on both sides of documents.

Scanners typically operate at 200, 300 and 400 dot/in., with resolution dependent upon the application. Most document management/work-flow applications can be successfully scanned at 200 dot/in. Applications using OCR require higher resolution scanning in order to recognize characters with fewer rejections and fewer errors.

• **OCR devices.** Historically, data entry operators using keyboards captured the intelligence contained in any given document. An alternative to totally manual capture and distribution is the OCR device.

OCR refers to any technology that uses optical means to translate a character-based symbol into ASCII. The bar code on food products is a fairly rudimentary example.

OCR is believed by many to have reached a price/performance threshold that makes it a cost-effective option for some, although certainly not all, commercial applications. Kevin Sharp, technical editor at *ID Systems,* suggests that OCR is economically viable for any organization receiving more than 100 pages of unencoded text per day.

For the most part, however, organizations currently use OCR to front-end their imaging systems only if they have a high degree of control over the quality of the input document.

Most OCR systems today can recognize specially constructed fonts, such as those at the bottom of checks or credit cards designed for ease of recognition, as well as single or multiple fonts on the same document.

The major stumbling block to fully automated data entry is hand-print recognition.

It is important to realize that achieving the 60% to 70% reductions in data entry expenses that are possible with OCR requires partnerships with both the business forms provider and the OCR vendor. Some systems achieve their high rates of efficiencies by employing more than one recognition engine — one for limited hand-print recognition and another for machine-printed information.

• **Neural Optical Character Recognition (NOCR).** This technology, which is a step beyond conventional OCR, holds promise as an eventual solution to OCR's comprehension limits. NOCR uses neural networks' ability to handle contradictory and imprecise data to permit optical reading of handwritten notes with broken figures, variable height and spacing and letters that touch or overlap.

In theory, NOCR is able to recognize patterns of symbols as opposed to individual symbols. In a test environment, NOCR page readers can recognize and process hand-printed characters at a rate of four char./sec. An average keypunch operator can process three to four char./sec.

An array of high-tech (and high priced) boutique vendors operate in the rarified air of the neural net imaging niche. Hecht-Nielsen Neurocomputers recently announced the first commercially available neural network compound document management system. In addition, several financial services firms and at least one government entity have spent significant research and development dollars perfecting NOCR. At this stage, however,

. . . .

imagespeak

Continued from page 67

and the reuse of previously recorded disc areas.

Facsimile server A device that supports datafax input and output to a computer system.

Half tone An image that creates the illusion of continuous tone on a bitonal display.

The initial Graphics Exchange Specification A standard format used for transferring computer-aided design database files between systems manufactured by different companies.

image board A hardware performance accelerator that, when added to a workstation, supports the rapid compression, decompression and manipulation of images.

image packet A block of compressed data prepared for transmission.

Journal drive An optical disc drive that records all document database storage transactions, including image and attribute data.

Jukebox An automatic storage, selection and retrieval device that provides rapid, on-line access to multiple optical discs.

Magnetic disk cache A directory on magnetic disk in the DSP that provides storage for and quick access to frequently used documents.

Magnetic ink character recognition A typeface developed so that information printed on items such as checks can be automatically read and encoded.

Micrographics The technology of capturing, storing and retrieving images on microfilm-based storage media.

Mixed-object document content architecture IBM's strategy for a document architecture.

North American Presentation Level Protocol Syntax A standard for graphical communications that provides a method of creating pictures and compressing them into a relatively short block of digital data for storage or transmission over low-bandwidth channels.

Optical character recognition A scanning technique by which characters printed in a standard typeface can be automatically read and converted to ASCII representation for computer storage.

Office Document Architecture/Office Document Interchange Format An International Standards Organization standard to allow the interchange of documents containing text, image and graphics among systems supplied by different manufacturers.

Optical disc A platter-shaped disc coated with optical recording material on which information is read and written using a light — usually a laser.

Optical disc storage and retrieval A mechanical device that manages multiple write-once read-many discs.

Optical Memory Disc Recorder A device used to write information to an optical disc.

Optical tape Reels, cartridges or cassettes of film used for data storage, coated with an optical recording material.

Pixel Short for "picture element" — the smallest resolvable basic element in a digital image.

Prefetching The process of building a queue of images for subsequent processing.

Reduction rate The degree to which a document is compressed and the associated space savings in memory.

Run-length encoding The transmission of numbers describing the lengths of white and black regions of an image rather than sending each black or white pixel separately. The basis for most of the data compression methods used in digital image representations.

Scaling A technique that enables reduction or enlargement of an image by combining pixels.

Scanner An image input device that interprets the reflected light from a physical image and translates it into a stream of pixels, digitized raster data or a stream of bits.

Write-once read-many A form of optical storage in which information can be recorded once and read many times, but not erased. •

This glossary draws on definitions supplied by Unisys Corp., Wang Laboratories, Inc. and market research firm Ovum Ltd.

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the use of neural networks in conjunction with imaging systems still remains the exception rather than the rule.

- **Electronic Data Interchange (EDI).** Probably the ultimate way to reduce data entry costs is to eliminate the paper and its associated scanning costs. One way is through EDI between vendor and supplier.

Storage devices

A variety of storage devices, such as optical discs, optical jukeboxes and magnetic disks, can be used alone or in combination.

- **Magnetic disks.** Although magnetic disks can be used to store the digitized images, the images are so large and take up so much space that most organizations find this option unsuitable for high-volume or long-term applications. Typically, a more practical use for magnetic disks in an imaging system is as a staging area where images can be kept before commitment to optical media.
- **Optical disc.** An optical disc is a write-once read-many device available in 5¼-in. or 12-in. sizes. A single 12-in. disc can store as many as 40,000 8½- by 11-in. pages, while a 5¼-in. disc can store about 8,000 pages. Disc density is improving, and in the future discs will be able to store more data. Optical disc media has a guaranteed life that varies from 10 to 100 years, depending on the manufacturer.
- **Optical jukebox.** An optical jukebox is a mass storage device for optical discs. A jukebox contains several disc drives with up to several hundred discs per drive. Robotics is used to physically load and unload optical discs into read/write drives. Because access time is limited by the speed of the arm, it may take several seconds to retrieve an image from a jukebox.

Display devices

For most image applications, a monitor with 100 dot/in. resolution is sufficient. Monitors with 200 dot/in. are required, however, to display legal documents or insurance claim forms. The increased resolution makes signature verification easier and enhances reading of large documents that have been reduced to fit the screen.

Landscape monitors can display two documents side by side for comparison or show both sides of a two-sided document simultaneously. Image manipulation capabilities at the workstation typically include the ability to scroll, rotate, exchange and invert.

Organizations making decisions on the size and scope of their initial imaging application wrestle with the question of what type of desktop device is appropriate. Image-enabled workstations need capabilities that many traditional personal computer configurations do not, such as larger screens for reading text, image board drivers to drive images and higher communication speeds to get images to and from the workstation. The memory requirements associated with storing and manipulating images are significant.

For departmental solutions requiring only one or two viewing stations, the expense associated with workstations that include all the imaging bells and whistles is tolerable. Extend that cost to 30,000 users, however, and you get a very different response from senior management.

Application software

Application software performs functions such as indexing, storage management, document distribution and work flow

Continued on page 74

Sizes and prices may vary

The diagrams on the right, representing possible imaging system configurations and their representative costs, were constructed for Computerworld *by Michael Connor, senior consultant at KPMG Peat Marwick/Nolan Norton & Co., in order to give potential buyers insight into the range of available alternatives. Below, Connor explains the methods that he employed to create these composite purchase scenarios. — EDITOR*

Just as no real family consists of 2.2 children and 0.75 pets, the configurations outlined in this section do not represent real solutions to specific needs. Their purpose is to provide a framework for understanding options and associated costs.

The vendors that consented to provide book-rate prices for these generic configurations represent a sampling, not an inclusive survey of imaging vendors. Some vendors decided not to participate, even though they were given the opportunity. Thanks are due to Digital Equipment Corp., Filenet Corp., Hewlett-Packard Co. and Wang Laboratories, Inc. for their input.

Real-world issues

In the real world, four major considerations determine the sizing of imaging systems:

1) The number of on-line users.

2) The volume of on-line documents.

3) The size and complexity of applications and work flow.

4) The extent and complexity of communications.

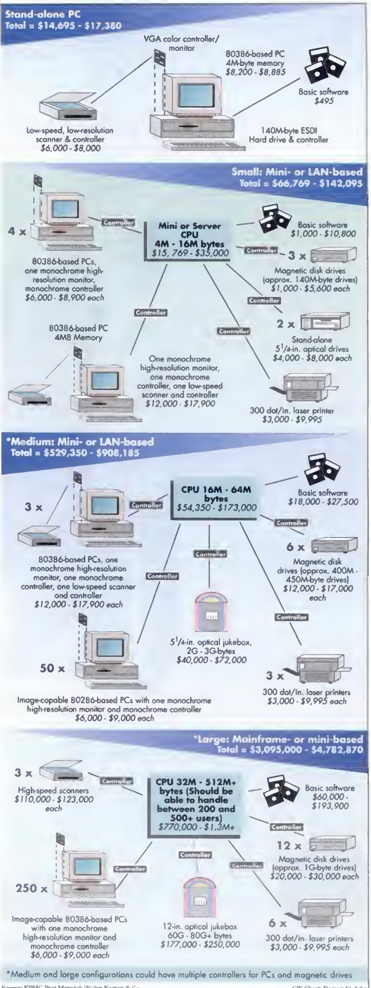
Working on a theoretical level to construct basic configuration scenarios, it is necessary to assume some things and omit or ignore others. We assume, for example, that a relationship exists between the number of users and number of on-line documents and that transaction activity is directly proportional to the number of users. We also assume that, for all configurations, some kind of optical disc storage is necessary.

Component peripheral use, such as scanner rates, are based on a packaged approach, rather than a systems integration approach.

Even though the vast majority of imaging installations involve customization for a given application, these configurations are based on average, rather than specialized, requirements.

All prices are quoted straight from vendor lists and include no discounting or negotiated pricing. Furthermore, prices for necessary pieces such as maintenance, support services and supporting software — such as databases — are not included because of the individuality of the solutions.

For the same reason, communications equipment, an extremely important consideration for any purchaser, is omitted from these pictures. ●


Stand-alone PC
Total = $14,695 - $17,380
VGA color controller/monitor
80386-based PC
4M-byte memory
$8,200 - $8,885
Basic software
$495
Low-speed, low-resolution scanner & controller
$6,000 - $8,000
140M-byte ESDI
Hard drive & controller
Small: Mini- or LAN-based
Total = $66,769 - $142,095
4 x
Controller
Mini or Server CPU
4M - 16M bytes
$15, 769 - $35,000
Basic software
$1,000 - $10,800
3 x
Magnetic disk drives (approx. 140M-byte drives)
$1,000 - $5,600 each
80386-based PCs, one monochrome high-resolution monitor, monochrome controller
$6,000 - $8,900 each
2 x
Stand-alone
5¹/₄-in. optical drives
$4,000 - $8,000 each
80386-based PC
4MB Memory
One monochrome high-resolution monitor, one monochrome controller, one low-speed scanner and controller
$12,000 - $17,900
300 dot/in. laser printer
$3,000 - $9,995
*Medium: Mini- or LAN-based
Total = $529,350 - $908,185
3 x
CPU 16M - 64M bytes
$54,350 - $173,000
Basic software
$18,000 - $27,500
6 x
Magnetic disk drives (approx. 400M - 450M-byte drives)
$12,000 - $17,000 each
80386-based PCs, one monochrome high-resolution monitor, one monochrome controller, one low-speed scanner and controller
$12,000 - $17,900 each
5¹/₄-in. optical jukebox, 2G - 3G-bytes
$40,000 - $72,000
50 x
Image-capable 80286-based PCs with one monochrome high-resolution monitor and monochrome controller
$6,000 - $9,000 each
3 x
300 dot/in. laser printers
$3,000 - $9,995 each
*Large: Mainframe- or mini-based
Total = $3,095,000 - $4,782,870
3 x
High-speed scanners
$110,000 - $123,000 each
CPU 32M - 512M+ bytes (Should be able to handle between 200 and 500+ users)
$770,000 - $1.3M+
Basic software
$60,000 - $193,900
12 x
Magnetic disk drives (approx. 1G-byte drives)
$20,000 - $30,000 each
250 x
Image-capable 80386-based PCs with one monochrome high-resolution monitor and monochrome controller
$6,000 - $9,000 each
12-in. optical jukebox
60G - 80G+ bytes
$177,000 - $250,000
6 x
300 dot/in. laser printers
$3,000 - $9,995 each

*Medium and large configurations could have multiple controllers for PCs and magnetic drives

Source: KPMG Peat Marwick/Nolan Norton & Co

CW Chart: Doreen St. John

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The stars.

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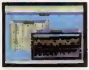

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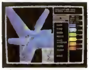

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Wardrobe

Continued from page 71

management. Database management software tracks document indexes.

One of the greatest promises offered by imaging is the ability to find the information you need when you need it. The ability to do so is a function of the flexibility and execution of indexing procedures. You have never lost something until you have lost it on an optical disc.

Once misfiled, that particular document/image will probably never be retrieved. The ability to create indexes that operate in a fashion similar to the way people work has become a critical skill.

Work-flow management software assigns work to users based on processing requirements and priorities established by supervisors and managers.

Besides controlling the movement and processing of image documents, work-flow management software automates tasks such as productivity measurement, report generation and work-load balancing.

Software replaces the sorting, distribution and routing of paper information and provides the administrative procedures and controls at each step of the process. It is used to set up work queues, or In baskets, so the operator handles requests according to an established order. In a well-designed work flow, the system also brings together all of the information the operator will require to process the transaction.

That the skill set required to build imaging applications is different is borne out by the fact that many of the major financial institutions working with imaging technology have changed their systems development life cycle. Not only is imaging development different, but it is also scarce.

Couple that with the dearth of packaged applications, and many companies have had no choice but to create their own customized software.

Communications

The size of images and the transmission of a large number of information packets can overwhelm most mainframe and mini-computer host-terminal networks. Imaging's bandwidth requirements can be shocking. Therefore, telecommunications managers are searching for ways to cost-effectively distribute images. (No, this is not an oxymoron.)

Investing in additional capacity is one possibility. Although this sounds extravagant, the backbone telecommunications infrastructure investment will pay for itself as more users are added to the system. The more users there are, the more the cost of the project can be spread out.

Deploying the right kind of telecommunications infrastructure can make the difference between a business environment populated by stand-alone imaging systems and one in which images are managed to maximum advantage.

For example, one large insurance company with six divisions had a $100 million total investment in telecommunications. When imaging was brought into one division, the increased telecommunications bandwidth requirements equaled the bandwidth requirements for the entire company's other information systems applications combined. The additional cost was $100 million. However, that investment was the proper infrastructure to allow all of the company's other divisions to bring in imaging.

Creative justification

Recognizing that corporate budgets often preclude organizations going out and buying all the bandwidth they need, there is still a variety of things companies can do on the application side that will rationalize bandwidth consumption. These include use of data compression techniques and organization of the storage communications architecture and design.

With the prospect of nationwide fiber networks, it becomes more reasonable to look to a future when firms might be able to cost-justify routine nationwide transfer of images. Given the current economics of transmission, however, companies are well advised to keep the image close to its initial entry point into the system.

Assembling the components of an imaging system is a time-consuming and expensive task. Conservative estimates are that worldwide expenditures for just the systems integration component of imaging will amount to $1.5 billion in 1992.

The constraining variables for seamless interfaces between the imaging workstation, image storage platform and database platform include the bandwidth and the quality of software and routing mechanisms for delivery and indexing of images. Once the restraints are overcome, the systems are as easy to use as a personal computer-to-mainframe linkup.

One reason the tab for integration assistance is so high is that most technology vendors are unable to deliver shrink-wrapped, turnkey imaging systems. Another is that there is no one to copy.

State of the art exists in the user environment, not in the vendor lab, and certainly not in the vendor's support literature. When it comes to imaging technology, installation managers have to discover their own realities on the basis of empirical experimentation.

Although there are hard decisions associated with a move into imaging, many organizations are finding (after an awkward initial cycle of alterations) that the new wardrobe required by imaging technology fits quite nicely. ●

May is director of imaging research at the Nolan Norton Institute, a research branch of IS consultancy Nolan, Norton & Co. in Lexington, Mass.

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J. C. Penney's Steltzer *says he believes that companies that have an intensive paper load must turn to imaging to retain the competitive edge*

Not as new

Continued from page 67

Companies that have successfully implemented a document image management system return to this point often: They have found a way at last to bring the power and controls of classical data processing to paper processes and in so doing have had the opportunity to rethink the way those processes work and who is needed to do them.

If this is imaging's greatest potential benefit, it is also universally thought to be its most difficult aspect. It turns out that companies where the imaging system works best — in which the "pilot" program has not stalled for a lack of cost-justification data — are those that methodically considered the *implications* of the new technology long before a single piece of hardware was unpacked or computer code written.

Out of pocket

Extent of investment in electronic image management varies greatly, depending upon whether a company defines itself as traditional or adventurous. Traditionalists, however, are picking up their spending pace

Electronic image management	Early technology adopters	Traditionalists
Average 1989 expenditures per company	$554,000	$187,000
Expected 1990 expenditures per company	$904,000	$490,000

Source: Association for Information and Image Management — Sample size: 726

When making the move to imaging, "Pick the biggest, not the smallest, application," advises Charles A. Plesums, senior director of image technology at United Services Automobile Association (USAA) Information Service in San Antonio. No one in the world has 20 years of expertise with imaging, he reasons, and so all the project's participants, "from system designers to the terminal installers," will need to learn the ropes. This means a great deal of overhead and makes it virtually impossible to justify cost in small settings.

Tearing business processes apart and putting them back together in new and streamlined ways involves managerial issues as well as technical and logistical ones. Some companies, having unblinkingly reviewed their business processes in this way, have decided imaging is not for them — not yet, at least.

"That's part of the reason the market hasn't taken off like a hockey puck," says Roger Sullivan, president of the Association for Information and Image Management (AIIM) and vice-president of image management systems at BIS CAP International, Inc. in Norwell, Mass. People have begun to realize the implications and potential impact of deploying imaging, "and they're saying they want to understand the effect on the next department and the larger division before they sign a purchase order for a half-million-dollar system," he says.

As Sullivan indicates, companies are not rushing to the technology in huge numbers. A *Computerworld* survey of more than 300 IS managers found only 17% whose companies had purchased an imaging system. The same survey turned up another equally significant statistic, however: Fully 40% of those who said they had not yet invested indicated that they were likely to in the next two years.

There are also other indicators that people are *thinking* in droves about imaging. One is the growth in both membership and conference attendance recorded by AIIM. The 47-year-old association experienced a 47% increase in corporate members between 1988 and 1989, and its annual show and conference has grown 22% annually for the past six years.

In other words, many users are intrigued but wary. In particular, they are concerned about the cost of image processing systems and the fact that the technology is admittedly still implemented around nonstandard architectures.

Another negative consideration for some is the prospect of widespread resistance. For the most part, however, companies that have implemented imaging systems report that their users have adapted to the technology with surprising ease.

This may simply be because documents continue to look the same whether they are held in the hand or viewed on a screen. Or it may be because the streamlining of old business processes that accompanies installation of an imaging system empowers workers, giving more responsibility than they previously had.

Users with narrow expectations — those who want imaging strictly because it will do away with paper filing cabinets and save 1,000 sq ft of space — can still justify the investment in imaging, but it's harder, Plesums and others say.

At Beth Israel Medical Center in New York, the imaging system for patient records will reclaim 2,000 sq ft of a 3,000-sq-ft filing area. Vice-President of Information Systems Martin Bieber says, "Two-thousand feet of space in Manhattan is really precious." But that savings was not the primary reason for purchase. The larger goals, Bieber says, were faster access to critical documents involving emergency care and improved efficiency in back-office insurance processing.

Enterprisewide access to critical documents is the scale-tipper for many organizations. Better responsiveness to inquiries from those outside the organization is also a powerful incentive. Sixty-two percent of the respondents to the *Computerworld* survey said providing better customer service was the second most important benefit of imaging after rapid retrieval of information.

The strength of these interests lends additional weight to the argument now being put forth by both users and consultants that this is not a technology for which piloting makes better economic sense.

Just as it is almost impossible to isolate image processing from existing business processes, it is inevitable that imaging systems be merged with existing information systems to provide enterprisewide benefits.

This is an area where much work remains to be done, however. Application interfaces to classical data processing systems are a neccessity if imaging systems are to be elegantly integrated with existing information systems.

Likewise, although vendors say — and market analysts agree — that standards will eventually arrive, they are currently lacking for such things as optical disc indexing formats. Interestingly, the absence of standards seems to be mostly a prepurchase issue. A number of firms that have happily installed image processing systems say that those who wait for a full suite of standards will be hopelessly behind those who have chosen to forge ahead and explore the technology's potential.

Investment by industry: 1990

Government agencies, banks and insurance companies have been the most aggressive early users of electronic imaging systems

Industry	Sales*	Units
Banking	$165.8	133
Government	$129.9	137
Insurance/other financial	$94.7	102
Discrete and process manufacturing	$121.6	112
Transportation	$36.5	35
Communication/utilities	$35.4	45
Business services	$27.6	49
Retail/wholesale	$13.7	20
Health care	$3.2	8

Source: International Data Corp. — * in millions

"It is imperative for paper-intensive businesses to investigate image processing technology now," says Neal Steitzer, senior project manager at J. C. Penney Life Insurance in Plano, Texas. Imaging "is a must to be competitive in the world today." •

Booker is *Computerworld*'s Chicago bureau chief. Alan J. Ryan, s *Computerworld* senior writer, also contributed to this report.

Application invasion

Imaging is being used in many application areas, but customer service is considered the most strategic

Financial
Enhanced country club billing
Remittance processing
Traveller's checks
Stock certificate tracking
Collections
Disbursements

Records management
Insurance folder management
Database distribution
Document distribution and control
Inventory records
Medical record management

Maintenance
Spare parts inventory
Repair tracking
Vehicle folder management

Customer service
New account applications
Customer correspondence
Contact maintenance

Human resources management
Interactive training
Performance measurement
Work-flow management
Employee records

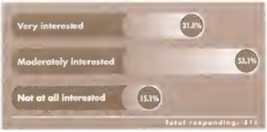
Source Nolan Norton & Co.

Impressions of Imaging

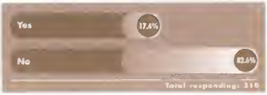
What more than 300 IS executives think about the technology

INTEREST AND INVESTMENT

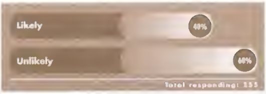
Please select the phase that best describes your level of interest in image technology



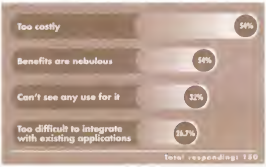
Has your company purchased an imaging system?



If you are not currently using image processing technology, is it likely or unlikely that your company will purchase an imaging system within the next two years?

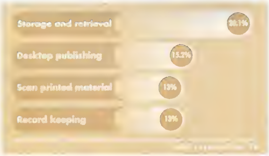


If unlikely, why?

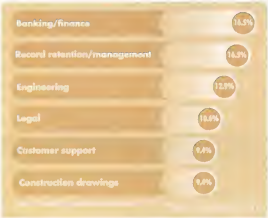


PULL FACTORS

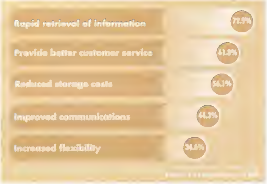
If your company has purchased an imaging system, what was the specific purpose for which the system was purchased?



If it is likely that your company will purchase an imaging system within the next two years, for what one or two specific business applications is it most likely to be used?



What do you see as the most important benefits of image processing?



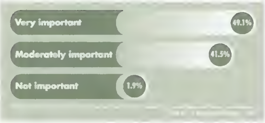
If you aren't at least interested in the possibilities of image processing, you are part of a minority these days. An exclusive Computerworld survey of more than 300 information system executives on the subject of image processing technology found a scant 15% who fit that description. Of course, not many can claim a personal acquaintance with the technology either. However, although it is a small force now, this group has big growth prospects. Survey responses indicate that the number of companies invested in image processing technology may triple over the next two years. It is also worth noting that these high levels of interest and purchase intent come from a population that is largely focused on the storage and retrieval aspects of the technology. When asked to provide their definition of image processing, an overwhelming number of respondents described these capabilities. Few, it seems, have even begun to think about the technology in terms of other document processing possibilities such as work-team exchange.

This survey was conducted for *Computerworld* by the IDG Research Services Group. Questionnaires were mailed to a random sample of 1,000 IS executives who are also *Computerworld* subscribers. Total response was 313. Of that number, 54 or 17.4% of the respondents came from companies that have already purchased an imaging system.

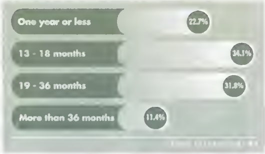
MONEY TALK

• • • • • • • • •

If your company has made a purchase, how important was it that you were able to justify the cost of the system?



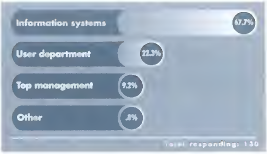
When do you expect payback on the system?



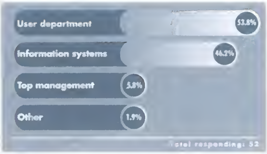
SPHERES OF INFLUENCE

• • • • • • • • •

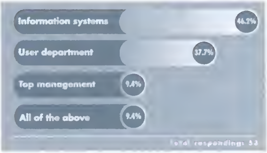
If your company has been contacted by an image processing vendor, who did they first contact?



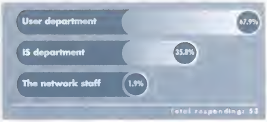
If your company has purchased an imaging system, who within the company initiated the purchase?



Who was responsible for selecting the vendor and model?



Who has principal management responsibility now that the system is in place?



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PRESENT POSSIBLE

Paper disposal and a whole lot more

by ALAN J. RYAN
and ELLIS BOOKER

Six months and $2 million dollars into a document imaging project designed to handle residential and small-business customer correspondence, long-distance carrier U.S. Sprint Communications Co. is right on track toward meeting its 15-month payback goal.

Unusual? Not really. While imaging is still considered a rich man's technology because of its high entry costs, companies using electronic image processing say it can and does pay for itself in hard and soft savings and benefits.

Suzette Sitzman, a project manager at Sprint's Dallas National Service Center, says the Filenet system installed there in May will very nearly pay for itself during the next year. The system, she explains, was one of the principal reasons the company was able to consolidate seven regional service centers into one. Because it is possible to handle information more efficiently from a central location, six fewer facilities and 50 to 60 fewer employees are required.

Although Sprint required some outside assistance — Perot Systems Corp. helped with setup and customization — Sitzman says installation was a relatively quick procedure. Integrating the Filenet system with Sprint's existing IBM 3090 mainframe took about a month.

Insurance giant United Services Automobile Association (USAA) has proceeded more slowly to its current megascale implementation of imaging, which involves a multimillion-dollar investment, more than 2,000 users and 1,400 image workstations, scanning more than 100,000 documents — nearly 1 million separate pages — each day.

From 3M to IBM

USAA started with a 3M Co. prototype, which it used from 1984 to 1987. It added a Filenet Corp. system in the first half of 1986 and then issued a request for proposals to handle an increased volume of mail in 1987. At that point, IBM was selected by USAA to be the vendor.

The electronic imaging application now runs on two IBM 4381s, with users working on a combination of IBM Personal System/2s and Personal Computer ATs equipped with Imageplus adapter cards. Traffic through these systems includes 15,000 incoming letters, as well as USAA's outgoing correspondence and policies are not scanned but are captured electronically into the imaging database.

Charles Plesums, senior director of image technology at USAA Information Service in San Antonio, won't disclose the price of the project. Plesums did say, however, that an cost study done at the outset of the project and based on 1,000 workstations came up with a five-year projection of $27 million for hardware, software programming and training costs.

USAA is currently studying productivity improvement from the imaging system. Plesums says early reports from the fellows with "the stopwatches and the clipboards" have tentatively set the productivity gain at 1.3%. That's slightly higher than the original goal of a 1% gain, but Plesums says he believes the final results will be even higher: "I know the system is being used more than that." And what's more, he says, supervisors of the employees are informally estimating a 5%

Continued on page 93

Russell O. Jones

Companies have to be realistic about payback schedules and cost justification. "If you're looking for immediate payback, it won't be there."

Paul McKinnon
Bank of New England

Those who just say no

by ALAN J. RYAN

Electronic imaging systems are not a universal cure for anything, including paper congestion.

The reality of electronic imaging is that, while it is a hot topic and a technology with obvious benefits, the price and relative immaturity of the products make it something many companies can survive without — at least for now.

Some executives believe their companies need imaging technology simply because they see lots of paper when they look around, says Wick Keating, vice-president of consulting firm American Management Systems, Inc. (AMS) which is based in Arlington, Va. But that kind of thinking can be misguided.

In one instance in which AMS was called in to investigate the possibility of imaging for a company, Keating says, "We found we could eliminate the paper at the source, through electronic data interchange with the suppliers."

Imaging is also the incorrect solution to a problem if the perceived benefits do not outweigh the expense, says Mary Rhodes, a senior analyst at New Science Associates, Inc., a Southport, Conn.-based market research firm. For example, she says, unless it causes significant inefficiencies,

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Linda Bleck

Watch the slippery spots

by ALAN J. RYAN

If getting there were truly half the fun, more companies would be moving to imaging technology. Both those who have made the journey into imaging and those who have watched many such odysseys from the sidelines report many challenges along the way.

Some of the rough spots that crop up in nearly every account are: index creation; document conversion; expense overruns; automating without improving a process; staff resistance; fitting new equipment into the existing systems environment; and dealing with issues of access and control.

• Indexing

Steven Quattrocchi, senior assistant treasurer at Stone & Webster Engineering Co. in Boston, says that creating the index for the company's new imaging system was the most difficult part of the installation process. "Every single index on our general ledger — every single account number — had to be accounted for on a piece of paper to tie it in the index with the appropriate documents," he remembers.

• Scanning and conversion

Another frequently mentioned sticking point that also gave Stone & Webster some problems was dealing with format variety in document scanning. "We were able to standardize our own reporting of expenses and receipts," Quattrocchi says, "but

Continued on page 88

Say no

Continued from page 81

keeping large paper files is not always a bad method from a cost standpoint. "There are lots of companies located outside of the major metropolitan areas where storage and filing charges are not that high," she observes.

Some companies, after taking a close look at the cost, labor or operational renovations associated with imaging, have decided to pass on the technology, at least for the time being.

"We have looked at imaging and are going in a different direction," says James L. Rhodes, assistant director of operations at the Utah State Tax Commission in Salt Lake City. The Tax Commission had been a microfilm-based records center, Rhodes explains, with long-range plans that included moving to imaging to capture its tax documents.

However, Rhodes says, as he explored electronic imaging and realized the capacity necessary to meet his goals, the expense of the project kept climbing.

Integration of imaging system components with other systems can be difficult

The Tax Commission estimated that to purchase sufficient equipment to scan, process and store all of the tax returns submitted to the commission during peak tax periods, they would have to invest between $2 million and $2.5 million, Rhodes says. "We already had $700,000 to $800,000 invested in microfilm equipment — not including 10 years worth of microfilm images," which would have meant discarding a significant investment in microfilm and tacking on another $2 million. Instead, the Tax Commission elected to make an additional $200,000 investment to upgrade its microfilm equipment.

After meeting with Eastman Kodak Co., the Tax Commission decided to go with Kodak's Image Link technology, which takes data from an archival microfilm base, converts it to a digitized ASCII stream and provides the ability to pass that information electronically from one point to another, Rhodes explains. "We have a poor man's version of what you may get with electronic imaging," he says, "but we don't need to have all our data on line."

Sticking with an imaging system based on micrographics also eliminates the need to deal with conversion issues of two kinds — those involving documents and those involving procedural precedent. Conversion of records is an expensive proposition, Rhodes observes, but of equal concern is the fact that "the state courts have developed a level of comfort with microfilm that has taken them at least three decades to achieve." Although there are some imaging systems in the state government, he says, it will likely take many years for document handlers to feel as comfortable with those systems as they do with micrographics.

Priscilla Emery also took a hard look at imaging from a financial standpoint. As manager of the advanced technology group at Blue Cross & Blue Shield of Connecticut, Emery says she realized that to bring in an expensive imaging system for Blue Cross' somewhat outdated systems environment did not make good fiscal sense.

Emery spent nearly eight months studying the imaging issue. For now, the health insurance company will not be moving to imaging, she says, but will continue to monitor the technology.

Both Emery and Rhodes say that if they were starting from scratch and had aisles of paper to contend with, their decisions might be different.

Deciding to forgo imaging today does not mean it is not on the minds of those who have said no

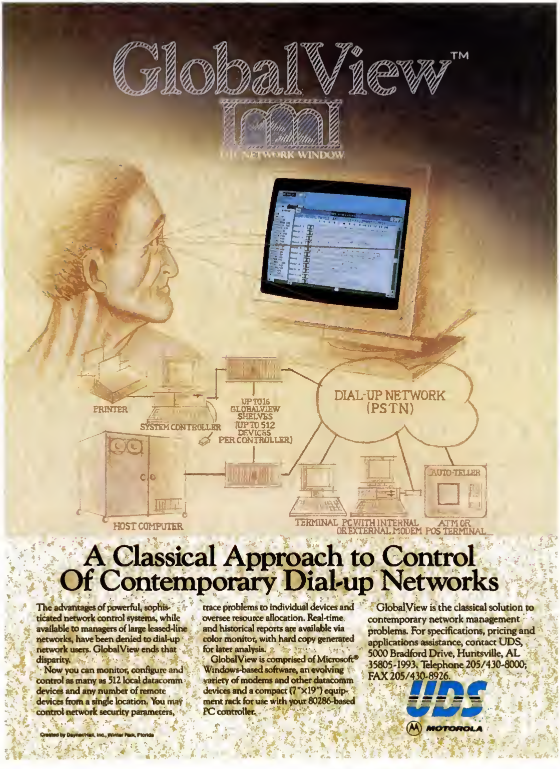
"We don't keep the paper," Emery says. The paper documents are microfilmed and then discarded. "What we have to justify [imaging] on is the improvement in the process, and that's productivity. Productivity is difficult to quantify, and therefore difficult to justify."

While imaging can be used today in practical ways, Emery says the standards have not evolved enough to satisfy Blue Cross. For that reason, she says, integration of imaging system components with other systems can be difficult.

Emery says her firm has not found any imaging systems that can easily coexist with the company's computing environment. "So we either change our current environment or create the interfaces to coexist with our environment," she says.

There are also areas of the technology in need of further development, Emery says. Optical character recognition (OCR) is a case in point. "The ideal is to have OCR, but when 50% of your stuff comes in handwritten, that is difficult," she says. Until more sophisticated OCR is available, or until Blue Cross changes the way it receives forms, OCR will continue to be a sticky point for imaging, Emery says. "Doing imaging without OCR means you still have to have a data entry function."

Still, deciding to forgo imaging today does not mean it is not on the minds of those who have said no. Emery and Rhodes say their current and future systems purchases will be made with an eye toward imaging — for example, they are likely to lean toward the purchase of workstations that could be easily adapted for electronic image processing. ●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Isolationism doesn't work

Robin Jareaux

by ALAN J. RYAN

It is easy to overlook the larger implications of imaging systems. Presented with a technology that promises an organized and efficient alternative to towering stacks of stored paper, it seems a small matter to insert that marvel into the work process. In the midst of contemplating new uses for liberated floor space or the heights of productivity that might be reached as a result of faster file movement, it may not be obvious that this single new cog could change the way that many company wheels turn.

Ignoring the potential impact of imaging systems on structure, culture and work processes can be a very big mistake, however. Most of the difficulties encountered in implementation stem from that single omission, says Lois Bruss, a socio-technical consultant at Wang Laboratories, Inc. When these issues are not confronted, Bruss says, a company sacrifices its best chance to make maximum use of the technology.

Paul McKinnon, a senior vice-president at Boston-based Bank of New England, agrees. Considering organizational issues "is very important in terms of understanding what imaging will do for your organization and for your back room," he says. "You have to analyze work structures and decide how departments will be structured."

McKinnon says that when imaging was brought into his functional area — which handles item processing and payment systems — in 1984, it brought about a number of significant process changes.

Working around the imaging system required taking considerably firmer control over some work flows, McKinnon says. "We also upgraded a number of jobs and pushed some of the clerical jobs into other functions, like opening mail."

Some of those changes might have been extremely traumatic, McKinnon notes, if the bank had not carefully prepared the way through measures such as a pre-installation training program designed to teach check handlers about the technology and its potential impact on their work.

Another important issue that companies need to consider, says Mary Rhodes, a senior analyst at New Science Associates, Inc. in Southport, Conn., is that while most of the jobs initially affected by imaging systems are clerical, expansion of

Continued on page 86

Avoiding legal gray areas

Robert Pizzo

by DONALD S. SKUPSKY

There's a right time to consider the legal issues that affect optical-disc records — before any commitment is made to developing an optical-disc system. Some forethought in this area can prevent costly mistakes, not only in terms of inappropriate investment but also litigation, fines, penalties and loss of rights.

There are a number of legal questions that should be considered. These include the following:

- Can you legally maintain records in an optical-disc system?
- Can you destroy the original records after they have been scanned, inspected and indexed?
- Can it be demonstrated that optical-disc records are accurate and trustworthy?

Answers will vary depending on whether optical-disc records are being considered in light of evidentiary rules, statutory requirements and regulations or special goverment requirements.

Hard evidence

Optical-disc records are merely electronic reproductions of the originals and will be treated similarly to microfilm, photocopies, facsimiles and even carbon paper in many courtrooms around the world.

The early British Common Law Best Evidence Rule requires that the best evidence be presented in trial. Originally, that meant live testimony as opposed to written records. Once written records became prevalent, the Best Evidence Rule required the originals as opposed to duplicates.

In the U.S., reproductions are now admissible to the same extent as originals. The Uniform Rules of Evidence and the Uniform Photographic Copies of Business and Public Records as Evidence acts have been enacted in most states to reinforce this principle. Because optical-disc records "accurately reproduce the original" — the standard required in both laws — they are admissible in evidence as reproductions.

Other common-law countries, such as Canada and the UK, recognize similar principles for the admissibility of reproductions.

The French Civil Law countries, such as France, Germany, the Soviet Union and most of Latin America, operate under different principles. These countries generally have very rigid and restrictive laws related to records maintained by businesses and admitting records into evidence, which may preclude reliance on optical-disc records. They may, for example, require either paper records or records that have been systematically notarized and approved by public officials.

Statutes and regulations

Most rules and laws governing records maintenance specify the content of the records but not the form. Others specifically permit such technologies as microfilm. Laws rarely mention optical-disc records.

In the U.S., you may perform any activity unless it is specifically prohibited or restricted by law. When the law does not address optical-disc records or other reproductions, you may use optical-disc records and destroy the original paper records. Otherwise, you follow the requirements of the laws.

Regardless of the records system you use, the system must be capable of accurately preserving required information. During a government review, your system must conveniently provide the auditor with the same information generally available with the paper records.

The retention of government records is generally controlled by the state or federal archives. They approve the period of time for keeping records and the format.

Government agencies are generally free to copy the original paper records to any convenient form. The archives, however, may not permit the destruction of the original records after reproduction unless the technology meets the specifications for archival retention. At this time, archivists only approve original paper records and silver halide microfilm for long-term retention. Media such as optical disc, computer tapes and magnetic disc may be appropriate for short-term retention of records (less than 10 years) but may

Continued on page 88

Will it pass the bar?

Although the biggest perceived disadvantages of electronic image management are cost and unseasoned technology, legality of output is also a major worry

Perceived disadvantages of electronic image management	
Expensive: up-front costs	53%
Not compatible with current systems	10%
New technology	52%
New vendors	19%
Output possibly not admissible in court	**27%**

Sample size: 726 (multiple responses allowed)

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Isolationism

Continued from page 83

these systems into new areas is likely to mean that professionals will also have to interact with the technology. At that level, she notes, gaining acceptance for the system can be tougher. "Senior or high-level people might be more resistant to being tied to a workstation," Rhodes says. "And you usually can't force them to work with imaging."

If you can't lick this group, Rhodes suggests, you may have to bribe them — providing incentives such as easy user interfaces, better search engines and easier-to-use indexes.

There are a number of things that a company can do before the fact to ensure that the introduction of an imaging system brings progress and productivity rather than trauma and dislocation.

First and foremost, it is important to get the house in order, which means conducting a careful study of the organization and its work flows.

"I've seen people who have not cleaned up their existing operation, and they think imaging is the panacea," says Stephen McNair, president of FTP Consulting Services, Inc. in Euless, Texas, and a board member of the Recognition Technology Users Association. "But imaging is like anything else," he says. "You have to have the operation cleaned up first."

Bruss says that the move to imaging should start when project teams are being assembled. When the team list is drawn, she explains, there should be an organizational expert on it, in addition to the usual complement of imaging and database experts.

This organizational expert could be drawn from within the company or be an outsider retained for the duration of the project. In either case, Brass says, the job is the same: "To look at people issues and make sure those issues are really tied in tightly with the decisions that are being made around the technology."

The following are specific issues that have to be considered:

- **The importance of job content.** "You want to make sure when introducing imaging that you are using it to enhance responsibility. You don't want to use imaging to routinize jobs."

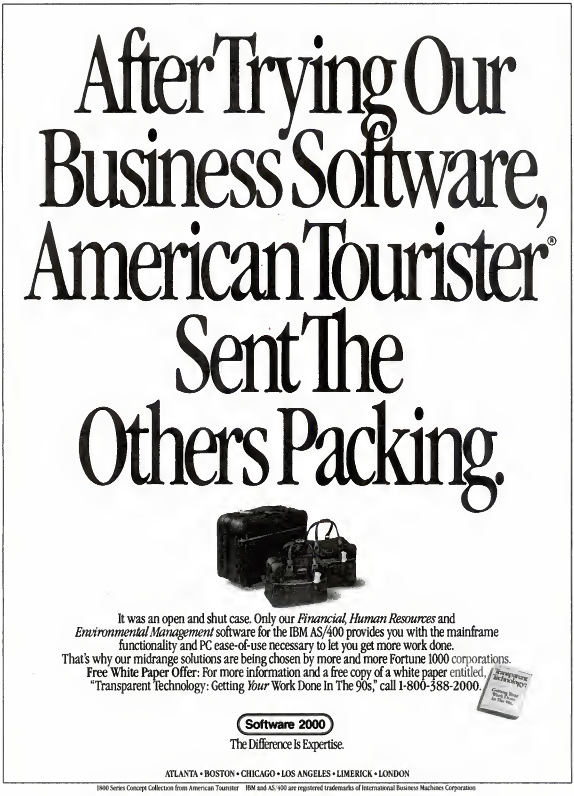
> **"Senior or high-level people might be more resistant to being tied to a workstation. You usually can't force them to work with imaging."**
>
> ***Mary Rhodes***
> ***New Science Associates***

- **The need for productive socialization.** Most people enjoy social interaction with co-workers, and that will still happen even if they do not have to physically pass documents back and forth. "We want to make sure that we can get people to come together and interact in ways that are going to further the goals of the company, rather than just taking more time at the water cooler."
- **The opportunity to improve work flow through job design.** White-collar work has evolved in a piecemeal fashion, Bruss says: "Imaging has allowed us to put those pieces back together and create whole jobs. Not only does that make the job more motivating to the person doing it, but you are also able to provide better customer service."

This kind of analysis of work processes and organizational structures takes a good deal of time and effort. It can be worthwhile, however, not just as a way of preventing problems, but in its own right.

Witness Blue Cross/Blue Shield of Connecticut, which has decided not to make a contemplated investment in an image processing system for now. Even though the company isn't buying the system, it is making some alterations to its operations that were suggested by an organizational review that was conducted in anticipation of the purchase.

"One of the outgrowths of looking at imaging was that it made us re-examine our work processes," says Patricia Emery, manager at Blue Cross/Blue Shield's Advanced Technology Group. •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Slippery spots

Continued from page 81

vendor bills, which also have to be scanned and indexed, come in a variety of sizes, shapes and colors."

- **Overlooked expenses**

Beyond the hardware and software components of imaging, other costs to consider are training expenses, consulting fees, time expenditures, integration costs, possible pay increases for workers who must learn new skills and severance pay if layoffs result. Conversion also usually winds up being more expensive than anyone expects, in part because companies frequently discover that much of the information they want to convert is misfiled.

Constructing a realistic cost estimate is a long process. "It takes something like two to three times longer to plan and justify your first imaging application than it does to design and build it," notes Brian Reynolds, a senior manager at Nolan Norton & Co. in Lexington, Mass.

- **Inappropriate application choice**

There is such a thing as playing it too safe. According to Reynolds, this is one of the most common causes of problems and disappointments with imaging systems. Companies, he says, "pick something that is safe so that if they screw up, nothing bad will happen." But when they do a great job of bringing imaging to an area that has no impact on anything, "everyone says, 'That didn't do anything for us.' " It is much better, he advises, to risk starting with an application that has a significant impact on the business.

- **Staff resistance**

Like any other kind of change that affects the way people work, the arrival of an imaging system can produce a certain amount of staff resistance and resentment. These feelings can be overcome, however, if those who are are affected are involved in the design process. In the words of one project manager, "When you have to change work-flow methods, some people are always upset to some degree. But once they see how easy it is to get the documents on their screen or print copies, they can see the benefits."

- **Integration**

Integrating these specialized systems with an organization's existing computer operations is no small feat. While many vendors claim to have "turnkey solutions" to imaging, the reality is that most companies either cannot afford to purchase all the pieces at once or cannot find everything they need from one vendor. Often, either consultants or integrators must be brought in to piece systems together and write the linking software.

- **Cross-departmental issues**

In many companies, imaging systems have been installed departmentally. In some instances, several departments have committed to systems from several different vendors. If and when it becomes important to share information needs on an enterprisewide basis, organizations that have moved into imaging in this manner find that they are looking at an additional investment for special bridges. ●

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Legal

Continued from page 83

not be deemed acceptable for long-term retention.

Archivists have expressed concern about the archival quality of the optical disc media, believing that information might be lost over time. The longevity of the media may not be the key issue, however. Recently, some optical disc manufacturers have developed discs that may be capable of storing information for 100 years or more.

A larger remaining question is whether the equipment necessary to read the information stored on the optical discs of the present will be available in the future. Because standards do not currently exist for optical disc images and computer and image technology continues to evolve, we may not have the appropriate readers and printers available to view images stored on optical discs. This may preclude the use of optical disc for long-term retention of records.

Some optical disc manufacturers have developed discs that may be able to store information for 100 years or more

Some people have expressed legal concerns about erasable optical disc records, because they can be modified or erased without detection. The legal status of optical disc systems is not compromised by the possibility of modifying or erasing images.

Non-erasable optical discs can also be effectively modified. To do this, you simply modify and copy selected images to another disc. Furthermore, records maintained on other technologies such as paper, updatable microfiche and computer files can be modified but are still admissible as evidence.

Records are admitted into evidence if they are trustworthy, accurate, complete and reliable. Trustworthiness may often be established by showing that you followed a process or system and that the process or system produced an accurate result.

In the case of an optical disc system, this would mean providing written documentation of the system's development and operation, proof of staff training and audits confirming the accuracy of your system. An adequate showing in these three areas should be sufficient to overcome concerns that the technology is trustworthy. ●

Who gets custody?

Heidi Stevens

by SUZANNE WEIXEL

Moving electronic imaging out of back-room data centers was never an issue; the technology got its start in user departments. Yet that quiet entry into organizations raises two of the bigger questions facing imaging today: Who should manage these systems? And who will maintain them?

> **"If the imaging system is going to exchange data with other systems in other departments, IS must be involved on both ends."**
>
> **Walter B. Novinger**
> ***Rothchild* Consultants**

Whenever there are many departments involved in the care and use of a system, there is potential for conflict, according to Roger Sullivan, vice-president of image management systems at BIS CAP International, Inc., a research and consulting firm in Norwell, Mass.

In this case, "IS looks at imaging and sees a useful technology. The business managers look at imaging and see a way to automate existing records management procedures," he says. Unless the two sides are able to negotiate a common vision that allows them to deal with issues of control, companies will miss the boat on productivity gains and cost-effectiveness.

Some companies opt for a balance of power, dividing control of the technology from control of the information that is stored on it.

Rusty Owen, director of Passenger Revenue Accounting (PRA) Systems at Northwest Airlines, says he believes that conflicts between the business side of PRA and the systems side have been avoided because of clearly defined roles as well as a respect for the other people involved. Owen claims that his group has always understood that its position is to advise and support, not control. "We support the systems that allow the imaging function to occur," he says. "[The business users] control the imaging function."

PRA Systems is not even located at the same site as the user group. Only a few support personnel are stationed on-site to handle daily maintenance of the system, which is used to track tickets and other sales documents. Owens says this arrangement allows the business group the freedom to use and manage the imaging system and the systems group the time to look for new technologies and new applications. "When they need us, they call," he says.

At Grumman Corp. in Bethpage, N.Y., responsibility for the imaging system is shared between the Data Systems Division and the legal department that the system was purchased to serve. Arthur J. Kingfield, program director at Grumman Data Systems, says the legal department establishes the priorities and manages the data, while the systems department concentrates on the technology.

Kingfield admits that at first, the legal department resisted the idea of a partnership. He says he believes that security was a major concern because confidential data was being scanned into the system. Once the attorneys understood that Data Systems' main concern was to keep the imaging system in good working order, they saw the value in the relationship.

"They don't need to worry about it breaking down. We don't need to worry about the data they scan into it," Kingfield says.

However, there are cases in which IS should become involved in managing the information scanned into imaging systems, says Walter B. Novinger, vice-president of the Image Systems Division at Rothchild Consultants in San Francisco. If imaging systems are interacting with a corporate database, Novinger says, it is in the best interest of the company to have IS involved in data management. Not only must someone be responsible for keeping the imaging system up-to-date on changes in the mainframe environment, but someone must also guarantee the integrity of the data brought into the mainframe via the image scanners.

"'If the imaging system is going to exchange data with other systems in other departments, IS must be involved on both ends," Novinger says. It has to oversee such everyday security functions as backing up data and assigning passwords.

Elias Safdie, the director of technology consulting at Strategic

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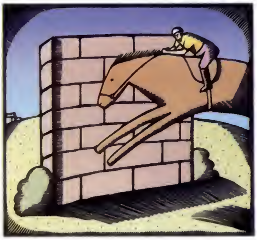

Randy Lyhus

Some turn back

by ELLIS BOOKER

While electronic imaging does generally produce the benefits proponents claim, not every installation proceeds without bumps or stalls. And, in a very small number of instances, frustrated users have returned to their preimaging ways of handling paper.

Much more common than outright failures, however, are imaging "pilots" that go nowhere.

The problem of pilot project lag is documented in Nolan Norton Institute's recently published "2nd White Paper on Imaging," which includes an analysis of some 600 imaging applications. According to Nolan Norton's count, 17.3% of the pilots had positive momentum, 2.1% had negative momentum and 80.6% had no momentum.

Scott McCready, director of image systems at International Data Corp. in Framingham, Mass., and a principal at Avante Technology, Inc., believes that the whole idea of pilots is flawed. "Pilots show people are wasting money and should be fired," he says.

For an imaging project to work, he advises, a company must commit to something major. "Who ever bought a PC before buying their mainframe?" he asks.

According to McCready, outright failures represent only a tiny percentage of production-level imaging projects. An IDC study of 225 production sites found problems at only 14% of the sites, and only 4% of those had been significantly affected.

Furthermore, McCready says, failures, when they do happen, are usually not attributable to strictly technical problems, but instead result from users "trying to automate something they couldn't really describe."

Probably the best-known failure to date happened at the California secretary of state's office, which installed a $4 million Filenet Corp. system in March 1989 to improve management of commercial filings.

"Our contract was for an integrated computing and imaging system . . . and that, I think, was the crux of the problem," says Assistant Secretary of State Jerry Hill, who believes Filenet did not have a sufficiently powerful server to support his application at the time.

Hill explains that the system, with its one server and 29 workstations, went into production on April 5, 1989, but "we were never able to process a day's work in a day. The best we were able to do was 30% of the incoming volume."

With businesses in the state screaming about delays and a looming two-month backlog of work, Hill decided in late May 1989 to remove the imaging system and return to the semiautomated batch mainframe system he'd had before.

To catch up, he had to hire 250 people on a round-the-clock schedule. That October, the state said Filenet was in default of its contract. Filenet and the state are in negotiations over the contract, Hill says.

A Filenet spokesman maintains that the fault lies with the secretary of state's office, that it was the customer's inability to support and train its staff and its lack of backup computer facilities that led to the difficulties.

Significantly, Hill still wants an imaging system. With the right system in place, he says, the 10- to 14-day turnaround time of the existing batch-entry system could be cut to 48 hours.

The secretary of state's office has completed a new imaging feasibility study. This time, however, it will specify that proposals must include plans for links with the existing mainframe database. "We want to look at imaging as a peripheral part of the system for filing and retrieval of documents, rather than as a stand-

Continued on page 90

Who gets custody?

Continued from page 89

Technologies, a division of DMR Group, Inc. in Wellesley, Mass., places capacity planning high on the list of reasons for IS involvement with any imaging project. Someone technically knowlegeable has to stay on top of increases in volume that could tax existing communications systems beyond their capabilities. "The potential strain on a network could be critical," he says.

According to Novinger, even when the IS department is not responsible for the way an imaging system is used, the user department relies on IS for successful planning and implementation. If IS can accept the role of consultant, the departments should be able to arrive at an amicable balance of responsibility between them.

At American Airlines, Jayne Metz, the AAdvantage customer service department's system administrator, works closely with a technical support engineer assigned to the department from its IS support group. She handles day-to-day problems such as what to do if the images aren't clear or if response time is slow. The support engineer takes care of problems involving software programming. Together, they coordinate communication between the user department and IS for planning purposes.

Metz sees IS playing a greater role as more technologies are integrated into the imaging system. "We hope to add bar-code and fax capabilities by the first quarter of 1991," she says. "We can't do it without our SCS staff to help plan and implement."

At Houston Lighting and Power's Nuclear Division, IS is involved in looking into advanced capabilities such as linking the imaging system to computer-aided design systems or using it to replace direct-access storage devices as a storage device.

The imaging system is run by records management, the same department that was responsible for archiving records before the imaging system arrived. IS becomes involved if there are technical issues to be addressed, such as adding a new workstation to the local-area network or upgrading software.

There is also another player with some say about how the system is used, notes Julie LeBlanc, manager of systems development. That extra presence is the government, which dictates, through federal and state regulations, what must be documented and how long some documents must be retained.

It doesn't matter whether the scanner is located in the mail room, the data center or the business unit, and it doesn't matter to which department the operator reports. What matters, Sullivan says, is that the different departments work together from the outset to determine how to fit the imaging system to the company's business requirements. •

Weixel is a free-lance writer based in Framingham, Mass.

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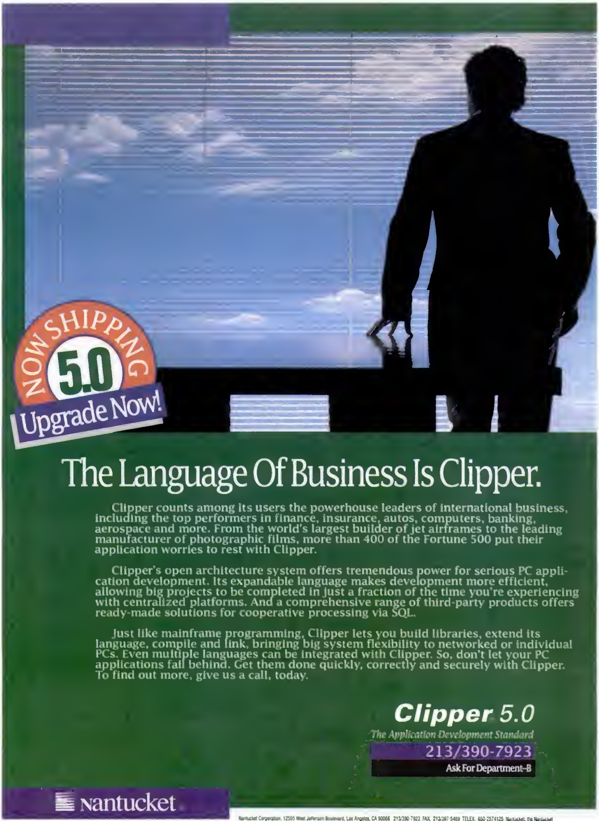

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Some turn back

Continued from page 89

alone, integrated approach," he says. Filenet will not be precluded from bidding, he adds.

If Filenet lost a round in California, it won one in Garden City, N.J., where Avis Rent-a-Car System, Inc. encountered problems with its first imaging vendor.

The company, which is now testing a Filenet application, originally contracted with IBM business partner Image Business Systems (IBS) in New York for a system to process insurance claims against drivers who damage Avis vehicles. The problem, according to Steve Adams, Avis' vice-president of data processing services, was that the core system was forthcoming, but the application software was not. IBS, he says, "could not own up to developing software [for the application]."

Terms such as success and failure can also have different meanings, depending on who is making the judgment. For example, is a system that takes four or five minutes to locate a form from an optical disc jukebox a failure? "We'd classify something that slow a disaster," McCready says, "but the users might not." •

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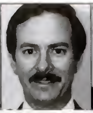

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U.S. Sprint's Sitzman *says imaging increased efficiency and allowed service centers to be consolidated*

Paper

Continued from page 81

improvement.

USAA is planning to add the technology to its property and casualty claims operation sometime in 1992. That Image Plus system, Plesums says, will support 3,000 to 4,500 users and include color photos and the digitization of telephone conversations to speed and improve customer service.

Although neither investments nor paybacks are always as dramatic as those at Sprint and USAA, most companies that have installed imaging systems have based their purchases on paybacks of between one and three years.

Those are fairly average payback timeframes no matter what scale you are working on, says Mary Rhodes, a senior analyst at New Science Associates, Inc. in Southport, Conn., adding that most of the systems in place today are, in fact, departmental implementations of single-vendor offerings.

Other experienced users of imaging systems, such as Paul McKinnon, senior vice-president at the Bank of New England in Boston, say companies have to be realistic about payback schedules and that cost justification is not always a one-shot deal. "If you're looking for an immediate payback, it won't be there," he says. His bank installed a $1.3 million imaging system to handle its lockbox (business deposits) accounts in 1983 and justified the purchase with a 40-month payback period.

"We had to cost justify then and [have done so] several times since," McKinnon says. Among other things, he says, rechecking the numbers helped to confirm that the bank's direction on imaging was still clear.

There are a number of reasons why such caution is warranted. Most of the companies interviewed for this article say they needed at least some outside help to set up their systems, which, almost without exception, incorporated products from a number of vendors. Most also say they have found a lack of readily available, sophisticated software.

Room to grow

Furthermore, as some users can attest from experience, planning and cost justification does not always guarantee a smooth road to success with an imaging system. Systems have to be selected with a careful eye to the future.

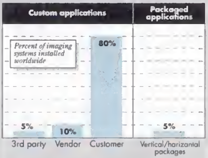
Gordon Bloom, vice-president of MIS at Roadway Package System, Inc., in Pittsburgh, knows all about that. The imaging system, which the small-package pickup and delivery company installed in May to handle service documents, such as proof-of-delivery records, is already having trouble keeping up with the rapidly increasing volume of business.

Bloom will not say whose system he is using — only that it utilizes personal computers as workstations and has interfaces to Roadway's mainframe. He also doesn't want to talk about how much the company paid. Bloom is, however, willing to go on the record with an optimistic prediction: "The system will pay for itself in better customer service and reduced manpower requirements once we get past our current problems."

The imaging software, written specifically for Roadway's applications by a systems integrator, can work, Bloom says. "It is just a matter of understanding the technology and the application and getting the right equipment in place to handle it."

Homegrown

Companies are developing their own imaging applications rather than waiting for packaged products to hit the market



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Neal Steitzer, senior project manager at J. C. Penney Life Insurance, a subsidiary of J. C. Penney Co., in Plano, Texas, is also something of an expert on the need to plan for growth in imaging systems. He installed a Filenet system with 20 workstations in June for the company's credit insurance line. Payback on the system, which is tied into an IBM mainframe, is expected after 37 months.

During that payback period, Steitzer says, 12 additional workstations will probably be added to the system. And, he adds, as business volume goes up, so will Penney's investment in imaging.

According to Steitzer, the major benefit of the system is cost avoidance: "As we increase our business, we won't have to add much additional staff." That, he explains, is an important point for a business that has grown from its first customer in 1987 to 1.2 million customers in 1989.

Avoiding extra staffing costs was also a large part of the justification for purchasing a Wang Laboratories, Inc. imaging system at the Secretary of State's office in Delaware. In this case the object was to minimize worker overtime. The outlay required to obtain those savings turned out to be higher than anticipated.

The snag came in the initial phase of implementation — the conversion process. Converting existing files to the imaging system accounted for nearly half the final cost of the $2.2 million imaging system, says Jeff Lewis, assistant secretary of state in Delaware. The cost of printing microfilm and fiche reports and then scanning some 3 million documents back into the imaging system was $1 million.

Unfortunately, it's not uncommon for companies to be blindsided by the cost and labor involved in document conversion.

The reality was also a lot bigger than expected for Pennsylvania Power & Light, which installed a Filenet system in March to manage engineering diagrams and documents in its nuclear records department. "We were hoping we could load the system with backfiles without adding manpower," says Deborah DeWalt, coordinator, nuclear records systems and procedures. "But we were forcing our people to work twice as hard."

The solution, according to DeWalt, was to add a second shift for the scanning operation.

The state of Delaware didn't do its own conversion. It hired a subcontractor, Alpha Systems in Huntington Valley, Pa., to handle the work.

> **Imaging remains, for the most part, a rich man's technology, although it appears to be changing**

Despite the costly start, projected savings still look good, according to Lewis. The department, which handles more than $200 million in corporation filings annually for the state, hopes to save $100,000 per year in employee overtime, thanks to the management reports the system can generate.

"Every morning I get reports, by priority item and by employee," Lewis says, adding that this information will allow him to manage his department's workload far better. The promise of better staff utilization was a big factor in the allure of imaging systems for Chemical Bank in New York, says Finance Vice-President William Lohmann. The bank made a modest investment of $200,000 to $300,000 in Wang imaging hardware and a work-flow manager developed by Computron Technologies Corp. in Rutherford, N.J., and Lohmann says he expects it will likely pay for itself in 1½ years.

Because Chemical Bank was already using Wang Office for electronic mail and word processing in its finance division, it helped bring down the cost of imaging, Lohmann says: "I had a piece of equipment that I would need for imaging in-house already." Computron Technologies Corp. was brought in to develop the imaging work-flow manager and developed the input and routing screens and statistical reports so users can locate any document at any time.

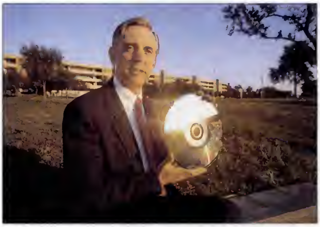
"The typical system's lifecycle is five years," Lohmann says, but he expects that when the system is in place at the bank, it will be able to migrate toward any standards that are developed in imaging.

Migration ability is also very imporant to Steve Quattrocchi, senior assistant treasurer at Stone & Webster Engineering in Boston, a subsidiary of Stone & Webster, Inc. The system, put in place for Stone & Webster by integrator Data Image of Glastonbury, Conn., links optical imaging systems from Data Image and Dicore International, Inc. with the company's IBM 3090 mainframe and has the ability to grow with future applications, he says.

According to Marcia Ellis, a principle analyst at Stone & Webster, the current imaging system, which went on-line earlier this year, utilizes two types of optical technology. One is the more traditional imaging system used for scanning and storing paper. "But we also have an optical system for storage of computer output — data that is taken from reports and stored directly onto optical," she says. The benefit of this, she says, is that the information can be put into the system without ever having to be put in paper form.

In the future, what Quattrocchi has in mind is electronic image retrieval from remote terminals. "That will require different hardware at the other end — it won't be just a mainframe terminal at the other end, it will be a personal computer-type terminal tied to the mainframe with special software."

That kind of prior planning is always a good idea, but it is particularly so for imaging systems, which are not a fast build. In most instances, it takes at least a year to bring a full-scale imaging plan to fruition. ●



Zigy Kaluzny

USAA's Plesums *says that productivity gains due to imaging were higher than originally expected*

Other places, other uses

Image processing is by no means a U.S. or even a North American phenomenon. UK and Western European companies are using the technology aggressively. In Asia, Japan is very heavily invested, although observers say most systems there are very basic. Below are a few glimpses into other parts of the imaging-developed world.

Ray Cranbourne/Blackstar

Jockey Club's Lai *says imaging brings labor savings, reduced storage and peace of mind*

The Royal Hong Kong Jockey Club

by STEFANIE MCCANN

There's no guarantee that your horse will win, but when you place a bet at the Royal Hong Kong Jockey Club these days, you can be assured of speed, accuracy and security.

This elite club, one of Hong Kong's largest employers, handles $5.4 billion in bets each year, using Wang's Integrated Image System (WIIS), based on a Wang 7010 microprocessor.

The system, installed in 1988, is used primarily for signature verification and bet tracking.

The Jockey Club used to rely on record cards, which were stored in large mechanical-assisted file cabinets. "By placing these cards into an imaging system, we no longer have the problem of misfiled cards, damaged cards or space problems," says Daniel Lai, information systems operations manager.

Installing the Wang system cost the club $600,000, and Lai says it has paid for itself in labor savings, reduced storage and security. Customers are better served because fewer people "have access to the system when retrieving signatures," he says.

The most difficult implementation problem the club encountered was the conversion of 500,000 card file accounts to image files. Now, however, all club staffers have to do is press a button to come up with signature cards and customer information.

In the future, the club is hoping to integrate imaging with data processing so that other records, such as payroll and personnel files, can be stored or retrieved with equal ease.

McCann is a *Computerworld* editorial assistant.

Fujita says *a magazine article led him to the supplier of a system to manage 2 million customer records at Japan Telecom*

Japan Telecom Co.

by YASUKO YOSHIMI

Deregulation of the telecommunications industry in Japan five years ago has brought about fierce competition for new subscribers there. To survive, long-distance carriers need to be able to manage massive swelling in customer records. That's why Japan Telecom Co. turned to Eastman Kodak Co. 18 months ago for a system that helps it to manage 2 million accounts.

Yuzuru Fujita, manager of the information systems group at Japan Telecom, read about Meji Insurance Co.'s use of the Kodak Information Management System (KIMS) imaging system in a Japanese communications magazine and knew it was what he needed.

The need to replace the existing system of hard-copy files had been clear for some time, Fujita says, but he was unsure whether to purchase a system based on microfilm or optical disc. Reading about KIMS made the choice easier: Because the system works with optical disc or microfilm, Fujita was able to choose microfilm without closing his options.

Japan Telecom purchased KIMS in May 1989 for $1.74 million; $357,000 was for the software license alone. Its components include Kodak's Film library and retrieval/reviewing terminal, a RIM-2000 microfilmer, two NEC PC-9801 personal computers, a Digital Equipment Corp. Microvax 3900 minicomputer equipped with a magnetic disk drive, six Vaxstation 3100 image workstations and four laser printers, each connected to four MS-3300 controllers.

The system went on-line in July 1989 and is networked via Ethernet across three floors. Two particularly noteworthy features, according to Fujita, are the system's ability to work with Japanese kanji and its use of bar coding for data entry.

The time savings are significant, Fujita says: The microfilmer can read 200 bar-coded application forms per minute and produce 100 microfilm duplicates — a process that manually takes at least one minute per application. Before the system was installed, customer service personnel needed 10 to 20 minutes to find hard copies of check account information; now it takes 60 seconds to retrieve information on-screen.

Next March, Japan Telecom will launch a self-developed electronic mail system that will allow remote offices to access the main database.

Yoshimi is a Tokyo-based free-lance writer.

Total-CFP (France)

by RAYMOND BOULT

Scott Rutherford/Blackstar

The days when oil exploration teams could plant pipes in the ground and watch oil bubble out are long gone. Today, oil companies expend much effort analyzing geophysical data to help locate pools of oil, which are more and more frequently found in remote locations.

At Paris-based oil company Total-CFP, the process has not been as ponderous as it could be: The firm uses a customized imaging system to help process and digitize the geophysical data collected through satellite photographs. That data is in turn used to enhance exploration maps.

The system, dubbed Ideals, was created for Total-CFP by Intergraph and was installed in 1985. It utilizes a DEC VAX 785 host, supporting five Intergraph workstations. Its home at the oil company is the topography and cartography department, which produces documents and maps relating to petroleum exploration.

There are three stages to Total's image preparation procedure: Radiometric processing, which allows satellite image enhancement on a pixel-by-pixel basis; geometric rectification which allows the three-dimensional effect of the image to be fit to a 2-D map; and multiple image composition by means of mosaic techniques and image-based management.

Each image is stored in a raster file in the image database. The mosaic technique consists of extracting and merging image subsets from each file to create a composite image that can be used as map background.

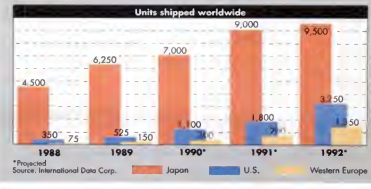
The time involved in processing this much complex data can be considerable. Total, however, has found a shortcut using image-based management. "We prepare several images of reasonable size, which are prerectified to cover the whole area of interest," says topography engineer Jean-Francois Dervieux. "Each time a map is requested, it is just a matter of calling back the pieces involved and merging them together to produce the final document."

The system's benefits encompass various phases of exploration, including assessment of possible drilling sites prior to bidding logistics evaluation and selection of drilling method.

Boult covers European business and technology issues from Paris.

Portraits of three markets

Japan now claims a commanding share of image system shipments, but most orders will come from the U.S. and Western Europe in the next two years



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Source. International Data Corp.

WAYS AND MEANS

First the goal, then the gear

by GREGORY VAN BUREN

Evaluating document imaging systems is a little like trying to find the best restaurant in Paris. There are so many choices, and so much depends on what you are looking for in a meal, or a system.

Imaging systems can be used for a variety of purposes. To begin with, there are four pivotal applications, which may be of interest to potential users in any industry. These are:

- Storage and retrieval, which is a basic function in all imaging systems.
- Work-flow automation, which promises enormous rewards but requires extra effort to accomplish.
- Full-text retrieval, a special option that appeals to select prospects.
- Office automation applications, which integrate imaging into broad information processing schemes.

Document storage and retrieval is a primary imaging application. In its most rudimentary form, digital image storage and retrieval replaces paper- or film-based systems. Such applications offer an inexpensive, compact way to archive information and provide fast access to it. Increased accuracy in fetching records is another benefit.

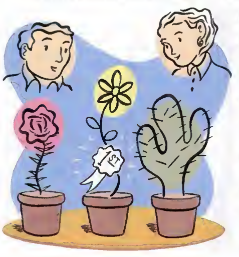
Storage and retrieval configurations run the gamut from stand-alone personal computers accessing thousands of images to host-based systems accessing millions. All imaging vendors provide basic store-and-retrieve functions. The most important variable to investigate is speed, according to users who have been through the selection process. Significant differences also exist in the amount of flexibility allowed by various products. Some allow you to change fields and set up your own processes for accessing images. Others set up these processes in advance, making alteration more difficult.

Some vendors are very particularly oriented toward storage applications. These are usually firms with heritages in paper and film records management such as Tab Products Co. and Bell & Howell Co. The main cluster of customers for these vendors would be companies trying to solve acute record management problems.

Work-flow applications enhance basic imaging systems by facilitating control over work processes. Beyond storing and retrieving images, work-flow software automates the flow of documents from one processing step to the next, typically eliminating many processing stages and streamlining others.

The leading vendor of work process applications has been Filenet Corp., developer of a high-level language for this purpose called Workflo. A number of other vendors provide good building blocks, but these are usually general-purpose tools adapted for development of work process automation applications. This is a rapidly developing area, however, and many vendors are learning lessons from Filenet's success. A good example of how far the idea has spread is Viewstar Corp., a vendor working at the personal computer level, which promotes the work process automation capabilities of its imaging software for networked PCs.

The greatest benefits of imaging systems come from improvements in work processes



John & Wendy

Full-text retrieval is a burgeoning image application. The chief advantage of full-text retrieval is that a user can locate documents based on any word rather than relying solely on key words in an index.

Furthermore, some installations that didn't initially incorporate full-text capability are adding it now, as price/performance improvements in components make the economics more compelling.

Micro Dynamics Ltd. has been a prominent vendor of imaging systems that include text search capabilities. Between one-fifth and one-quarter of imaging system vendors now offer full-text

Continued on page 98

Imaging Systems Integrators

NAME, CITY, STATE	NUMBER OF PROJECTS COMPLETED	INDUSTRY SPECIALIZATION	SYSTEM EXPERTISE	GEOGRAPHIC COVERAGE	VENDOR RELATIONSHIPS AND/OR PRODUCT PEFERENCES
American Management Systems, Inc. **Arlington, Va.**	25	Government, financial services, transportation	Large-scale document processing systems	Worldwide	No VAR/OEM relationships. Work with all major vendors, including IBM, Filenet, Wang, Laserdata, etc.
Anderson Consulting **Chicago, Ill.**	100	Airlines and hospitality, aerospace and defense, manufacturing, utilities, healthcare, government, financial services, telecom industry group	Document storage and retrieval systems, work group automation, professional workstations, engineering document management	Worldwide	VAR for Filenet, Hewlett-Packard, Sun Microsystems
Bell Atlantic Systems Integration **Arlington, Va.**	Not provided	Finance	Network integration of wholesale lockbox operation	Nationwide	VAR for Kienzle 9017-IPS Image Processing System; however, concentration is on the applications and on finding hardware, software, and network components appropriate for business needs
Dataimage, Inc. **Glastonbury, Conn.**	37	Financial services, insurance (including title insurance companies), manufacturing	Financial services support, library, loan management, medical records, electronic funds transfer	Conn., Fla., Mass., Minn., N.H., N.J., N.Y., Ohio, R.I., Japan	Emphasize open architecture-based solutions which are built on a personal computer platform and typically networked with the customers mainframe. Work with Sony's optical discs, jukeboxes, digital data storage drives, tape based on DAT technology. Tandem Computer's optical Archival and Retrieval System
Electronic Data Systems Corp. **Dallas, Texas**	50	Manufacturing, healthcare, state and local government, transportation, utilities	All kinds and sizes of systems, High volume, distributed technologies. Multiplatform, vendor-independent, open architecture systems, integrated with information management systems	U.S., UK, Ireland, France, Singapore	No VAR/OEM relationships. Work with multiple vendor relationships at two levels: component/device manufacturers and software vendors and major manufacturers, including Apple, Apollo, DEC, Hewlett-Packard, IBM, Sun
Ernst & Young **New York, N.Y.**	6	Healthcare, insurance, manufacturing, pharmaceutical, finance	Ranges from mainframe image processing systems software to micro LAN-based systems	Nationwide	No VAR/OEM relationships. Service is both client-focused and independent
Genesis Imaging Technologies, Inc. **Valley Forge, Pa.**	16	Telephony, federal government, pharmaceutical & chemical, financial services	Technical libraries, laboratory records, records management	Nationwide	Relationships with Sun Microsystems, Sony, Calera, Fujitsu. Emphasize Unix based, open systems
Grumman Infoconversion **Woodbury, NY**	25	Pharmaceutical, healthcare, financial services, state and local government, manufacturing	Client/server, open architecture systems with Unix servers	Nationwide	Relationships with Cygnet, Hewlett-Packard, Plexus Software, Sun Microsystems, Wyse and others. Use standards-based products. Focus on Plexus XDP as base platform
Litton/Integrated Automation **Alameda, Calif.**	45	Aerospace, financial services, manufacturing, process, transportation	Technical documentation storage, retrieval and distribution systems, and transaction processing systems; large systems with high transaction rates	Worldwide	Business relationships with a number of vendors supplying products for the incorporation into systems as needed
Science Applications International Corp. **San Diego, Calif.**	7	Pharmaceutical, insurance, financial services, state and local government, federal government, petrochemical, education	Document storage and retrieval system, work-flow management systems. Primary applications are office automation an dlaboratory automation. Client/server architecture on LAN using PC server. Also can use IBM 370, 390 mainframes running VM operating system. Also utilizes MS-DOS-based PCS for workstations	U.S., Europe, Canada	Relationships with IBM, Xionics. Utilize own product platform, called Mosaic, a Windows-based workstation, customizable at low cost and capable of utilizing PCs and VM host computers as servers on a token-ring local-area network.
TRW Financial Systems, Inc. **Berkeley, Calif.**	25	Banking, financial services, insurance, government	Payment processing, check processing, sales draft processing, insurance applications/underwriting, credit applications, customer service	Worldwide	Have many VAR/OEM relationships, but none are exclusive suppliers. Utilize the components that are best suited for the specific project

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First the goal

Continued from page 95

capability. This is a recent development, however, and often accomplished through alliances. Several imaging vendors, such as Laserdata, are now enhancing their imaging systems by linking to full-text retrieval software, such as Information Dimension, Inc.'s Basis Plus.

Some businesses are beginning to view imaging as an extension of office automation rather than a stand-alone application. This entails treating images as another data type that is combined with text, tables, graphics and sometimes even voice or video.

While integrating images into a broad office automation architecture is complicated, this strategy can offer significant efficiencies. Among other things, it can eliminate the need for redundant information systems components — one set for images and another for other kinds of data. Although full integration of imaging and office automation is not yet common, it is expected to be widespread by the year 2000.

Wang Laboratories, Inc. and Digital Equipment Corp. are pacesetters in the broad field of vendors moving toward integrated imaging. In 1987, Wang introduced its WIIS system — based on existing data processing and office automation products — its VS minicomputers, Pace database and Wang Office.

Wang has gone on to announce support for a broad set of nonproprietary systems. DEC's Decimage strategy adds image capability to its existing platforms. Decimage fits into the company's Compound Document Architecture and is also compatible with Decwindows and All-In-1 software.

Industry applications

Imaging requirements can also vary with the business needs of particular industries. There are many market segments of this type that demand their own specialized imaging applications, but three of the key ones are government, financial services and engineering.

Government demand for imaging is diverse but stems largely from the need to provide faster access to information at a more reasonable cost. An imaging system that will deliver birth certificates to the public in 15 minutes, rather than two to three hours, is representative of such need.

Almost all imaging vendors aim to sell government applications. Systems integrators such as Advanced Technology, Inc. and EDS are especially significant suppliers to government agencies.

Financial services firms, including banks and insurers, have been leading adopters of imaging technology. Some firms are using imaging as a competitive weapon. For example, Bankers Trust has found that demonstrating the capabilities of its imaging system to prospective customers helps it garner mortgage trust business. More typically, financial service firms use imaging to process checks, control retirement plans and review loan applications.

Unisys Corp. is one of the many suppliers focusing on this industry. Citicorp is an example of a sophisticated user that has become an imaging vendor targeting its own turf.

A myriad of uses

Engineering imaging applications address demands of firms in aerospace, the automotive industry, electronics, information processing, architecture, construction, utilities and so on. To satisfy engineering customer needs, imaging applications handle large-size drawings as well as related drawings in office formats.

For technically oriented businesses, image management systems support myriad departments. In addition, users in core user departments often call for interfaces to related applications such as technical illustration, manufacturing resource planning and shop floor controls. Consequently, technical support requirements for engineering applications can be quite considerable.

Benefits are also considerable. One engineering installation using imaging actually cut drawing retrieval time from three weeks to five minutes, freed up manpower and saved hundreds of thousands of dollars by reducing the length of production line shutdowns.

A host of imaging vendors actively pursue the engineering segment. Some, such as Access Corp. and Alpharel, Inc., focus on delivering specialized software to engineering customers. Others, such as Integrated Automation, Inc. and ABB Engineering Automation, concentrate their efforts more heavily on providing integration services. Meanwhile, many vendors that offer office-oriented systems also configure special solutions for engineering customers.

In addition to evaluating system possibilities from an application standpoint, buyers in any sector must consider other technology issues.

Many decide first on a corporate strategy for relational database management and then select an imaging system that supports their choice. Others find that graphical user interfaces are paramount and look for applications running under Microsoft Corp.'s Windows or whatever environment they prefer. Because of the importance of tailoring systems, support for applications development tools such as applications frameworks and high-level work-flow languages can also be critical. ●

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Van Buren is a consultant in the electronics, information and telecommunications systems unit of Arthur D. Little, Inc. in Cambridge, Mass.

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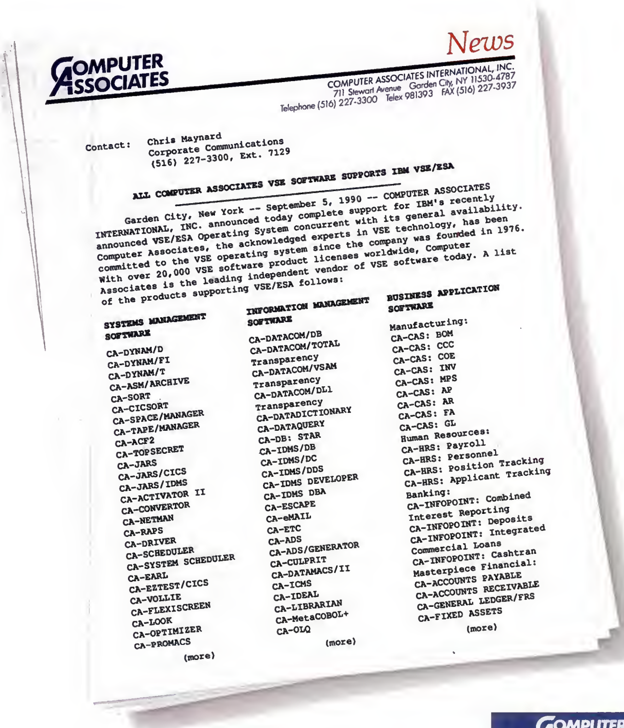

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THE LONG VIEW

Between now and ideal

by ELLIS BOOKER
and ALAN J. RYAN

Terry Allen

Ask experienced electronic imaging users and their systems vendors to speculate on the future of this emerging technology, and you'll frequently hear the same themes: Price/performance will improve in scanners; optical storage systems and applications software will make the technology more desirable; and imaging systems will stretch to embrace more territory — both in terms of actual distance covered and areas of use.

Right now, most imaging systems are departmental configurations, targeted at narrowly defined tasks. Over the next few years, more sites will likely install enterprisewide systems to perform more jobs on a larger scale and to satisfy larger goals.

"At the outset, imaging was largely at the department level, and the approach to getting started was 'bottom up,' " says Sam Altiero, a partner at Andersen Consulting in New York.

"Now, many of our clients who focused on specific applications are looking at sharing information across the enterprise" to speed the time it takes to process information and to help improve customer service, Altiero says.

A twofold concern for these customers, Altiero says, is figuring out which applications are worthy of such a cross-enterprise imaging commitment and then ensuring that what they do in year one will be compatible with what they do in year five.

Ensuring forward compatibility is a tall order when a technology is still taking shape, however, and that is very much the case with imaging. While vendors of imaging products say that the technology is at a maturity level that enables it to be used effectively, most agree that imaging today only skims the surface of its potential.

"We know today that we can't picture, for ourselves or our business partners, the technology that we will be employing in two years," says Carol Covitz, director of marketing for imaging solutions at Bull HN Informations Systems, Inc. in Billerica, Mass. "Changes are still happening at a rapid rate," Covitz explains.

Investment by industry: 1993

Most industries will more than quintuple their investments in electronic imaging. For some, the increase will approach tenfold

Industry	Sales*	Units
Banking	$917.7	992
Government	$675.5	1,105
Insurance/other financial	$565.3	769
Discrete and process manufacturing	$669.6	874
Communication/utilities	$185	331
Business services	$169.6	356
Transportation	$168.7	270
Retail/wholesale	$82	158
Health care	$30.1	93

Source: International Data Corp. * in millions

Changes are also happening on several levels. The component parts of imaging systems are evolving, and that evolution is already starting to suggest new ways of using other kinds of existing technology.

In addition, it is clear that advances in a number of other technologies will have a major impact over the next few years on how imaging systems are viewed and used.

Here is some of what's happening or may happen in terms of imaging system components:

- Improvements in lasers, the drivers for optical technology, will increase the storage capacity of optical discs 30% to 60% over the next three years, predicts Jim Moore, general manager of the Write-Once Optical Division at Sony Computer Peripheral Products Co.
- Median access times for optical discs are expected to decrease. Today, average access times for rewritable optical discs are about 95 msec; write-once discs are rated at approximately 150 msec. Within the next several years, those numbers could drop to 75 msec and 40 msec, respectively, says Stan Halper, president of New York's Teletrak Advanced Systems, Inc.
- The reading ability of optical character recognition (OCR) technology will improve drastically. The current generation of OCR equipment can recognize machine-imprinted information in certain fonts. In the future, it will handle any font, and work is proceeding toward giving OCR the ability to read handwritten copy.
- Artificial intelligence will become a feature of imaging systems and is expected to help alleviate the need to scan documents in their entirety. Imaging systems will be able to capture and transmit particular data deemed relevant for the job by the user. "In many situations, it's the information, not the document, that needs to be captured."

Most vendors agree that imaging today only skims the surface of its potential

One instance of the potential of imaging technology to alter other technologies can be found in the area of electronic data interchange (EDI).

"Imaging takes EDI the next step," says Thomas E. Turner, director of U.S. sales operations at Wang Laboratories, Inc. For example, he says, EDI now delivers a purchase order for a part "but not the diagram or drawing of that item." Imaging can

Between now and ideal

Continued from page 103

change that, allowing users to incorporate graphical information into the EDI document.

Part of the natural progression for imaging, says Bob Castle, vice-president of marketing at Filenet Corp. in Costa Mesa, Calif., will be the integration of the technology with other technologies. But equally important will be improvements in other technologies that will have an impact on imaging.

One area where new developments are expected to have substantial impact on the evolution of imaging systems is application development — specifically, nonproprietary computer-aided software engineering (CASE) and object-oriented programming tools that encompass imaging. Such products will make the creation of image-enabled applications easier and faster.

These software tools are even more critical, some believe, than the imaging technology itself. "You won't be talking about imaging next year; you will be talking about work-flow software," says Scott McCready, director of image systems at International Data Corp. in Framingham, Mass.

McCready says he believes there will be two levels of work-flow tools: one that is intended for programmers who are creating production applications and an ad hoc type for end users that will enable them to manage their own work flow in relation to others.

Today's imaging is largely focused on storage and retrieval, says Mary Rhodes, a senior analyst at New Science Associates, Inc. in Southport, Conn. As yet, there is not much emphasis on developing applications that incorporate imaging. However, that's the logical direction of this burgeoning technology.

"We will see more software development efforts that focus on imaging not only for building hooks to existing applications but new developments centered around imaging," Rhodes says. Areas of likely concentration, she suggests, will include transaction processing, decision-support and basic work-flow software applications.

Advances in communications technologies will also play a leading role in the future of imaging.

Because a typical image document requires 10 to 20 times more data than a textual document, the network bandwidth requirements of imaging systems are high. Advances in high-speed local-area and public network communications technologies will eventually make widespread exchange viable. At that point, users will be able to send large, data-dense documents within their buildings and across the country at reasonable speeds.

Large-scale integration

Ultimately, images, voice recordings, graphics and "classical" data processing applications will come under the control of integrated computer systems.

"The challenge then will be managing all this information, harnessing these assets," declares Roger Sullivan, president of the Association for Information and Image Management and vice-president of image management systems at BIS CAP International, Inc., which is based in Norwell, Mass.

In this multimedia environment, Sullivan says, software will help in the decision-making process by packaging information, regardless of its form, and presenting it to users.

Common user interfaces will provide easy access to image data. "A user will click on a graph to see the raw data, or click on the name of a widget and see the widget or a CAD/CAM drawing of the widget."

Expectations and realities

One goal users share for imaging systems is that they will some day be able to pass data back and forth among different computer systems seamlessly.

Today, there are some areas where vendors are agreeing on imaging standards — such as image compression. In other areas, such as optical disc sizes or the manner in which information is written to the discs, they continue to disagree.

Advances in communications technology will also play a leading role in the future of imaging

Further sets of standards are expected to emerge in the next several years, according to the vendors. Until then, entrepreneurial companies and systems integrators will be able to open a potentially lucrative market by creating bridges between various systems.

Users anticipate that the price of imaging technology will drop. And indeed it will. Bull's Covitz says that by the end of 1992, prices of scanners and optical storage devices could drop by as much as 50%.

Still, while the individual component prices of imaging will come down, spending on imaging will no doubt climb, says Brian Reynolds, a senior manager at Lexington, Mass.-based Nolan Norton & Co., an information technology firm of KPMG Peat Marwick.

"Expenditures will go up because people will be moving from technological experimentation and pilots into more automation of the end-to-end business functions," Reynolds says. "Thus, the overall investment is going to go up dramatically." •

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Review Criteria

Reviewers will evaluate papers along nine principal dimensions: significance, AI technology, innovation, use, payoff, deployment, maintenance, quality, and clarity. Papers should include technical details about the applications. Authors should try to quantify the development and deployment costs, as well as the benefits of the application.

Questions that will appear on the review form have been reproduced below. Authors should bear these questions in mind while writing their papers and use them to evaluate their papers before submission:

Significance: How important is the work reported? Does it attack an important / difficult problem or a peripheral / simple one? Is the problem adequately described? As reported, how unique is the application? Is the application technically significant?

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TECHNICAL HURDLES REMAIN

Although image processing technology is already producing significant benefits for many organizations, there are still a number of unresolved technical issues. These issues, which include the state of standards for imaging systems, constraints on use of current networks for image transmission, component limitations and even the chaotic condition of terminology, should be given careful consideration by an organization planning to adopt imaging on an ambitious scale

Language confusion and escalating complexities

by TERRY MENTA

Language development is a technical barrier that must be scaled if document imaging is to reach higher application plateaus

The diverse technologies that underpin document imaging have survived the high mortality rate associated with infancy, but that does not mean that they have achieved full maturity or that there aren't more challenges ahead.

These technologies have already given some proof of their ability to improve worker efficiency through the performance of document storage and retrieval functions. Now harder tasks are being set as companies try to integrate these technologies with others of long standing to create robust applications strategic to the enterprise.

At this level, the stakes are higher, and the technical issues are more complex.

The first — and possibly the highest — technical barrier that must be scaled if document imaging is to reach higher application plateaus is language development. Currently, we are working with an imprecise and confusing vocabulary that was born of a fledgling industry preoccupied with inducing a sustaining market base. It is difficult, if not impossible, to have a coherent discussion about either goals or the means to achieve them with so many indefinite definitions in use.

Trying to describe a range of endeavors that includes remote sensing, television and video, microphotography, machine vision, medical diagnostics, electronic publishing, design engineering and business information systems by using words or phrases that are as imprecise as "imaging" or even "electronic imaging" clouds communication. Both technical issues and business considerations vary substantially across these disparate endeavors.

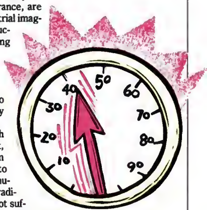
The first step toward clearing up the current confusion has to be the creation and enforcement of delimiting terminology. A good start is to refer to imaging for business purposes as "document image processing."

The term "document" is broad enough to encompass the range of document sizes from bank checks to oversized engineering drawings, yet precise enough to dispose of numerous technical

Continued on page 106

Limitations of existing networks

by SIDHU BANERJEE



Many large user organizations, particularly in health care, financial services and insurance, are now pondering migration of their small, trial imaging applications to enterprisewide production systems. As they consider imaging within the context of enterprise networks, organizations face a number of hurdles relating to architecture, protocol and transmission speed that must be understood and overcome in order to deploy systems that will serve users today and in the future.

Imaging requires consistently high networkwide speeds and throughput, consistent data access and transmission techniques, workstation receptivity to high-speed data and interoperable communications protocols and standards. The traditional corporate enterprise network is not sufficiently flexible to support these requirements.

Current enterprise networks are mainframe-centered, and access to host resources is typically provided through low- to medium-speed (4.8K bit/sec. to 56K bit/sec.) access lines. This architecture limits the speed and effectiveness of imaging applications in two ways:

- Stand-alone imaging applications are limited by server and disk access bottlenecks.
- In a hierarchical network with low-speed access, the low-speed lines and host-based switching represent points of greater congestion that unacceptably limit network performance.

The traditional corporate enterprise network is not sufficiently flexible to support imaging's requirements

Transitional stages

Right now, the enterprise network is in flux because of pressures from technologies including imaging, local-area networks and client/server computing. These technologies exert pressures for higher throughput, "flatter" topologies and increased support for diverse and currently unstandardized protocols.

Enterprise networks being developed today typically consist of a wide-area backbone, high-speed metropolitan-area subnetworks, associated campus networks and local end-user and processor networks.

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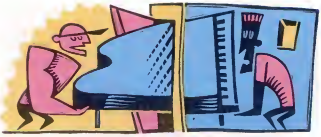

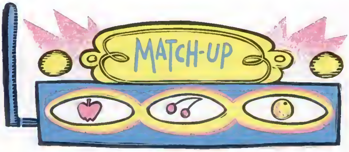

Robert de Michiell

Language confusion

Continued from page 105

issues that are irrelevant in the document context. The addition of the term "processing" helps to differentiate storage and retrieval and work-flow applications from document creation in electronic publishing.

A second and equally necessary step at this point is to approach evaluation of the technology from the perspective of business requirements.

The best starting place is with a grouping of business processes into application sets. For example, it is possible to think of document image processing in terms of five application groupings. The first grouping, document storage and retrieval, is relatively well understood at this stage. The following are other less-known application sets that are just starting to emerge:

- Work in progress (work flow).
- Image-aided data entry.
- Item processing.
- Knowledge-worker augmentation.

In terms of complexity, cost and benefit, each succeeding application set in the list builds on the preceding one. Each application set boundary marks a new price point and a new level of technical risk. Even more important, for cost/benefit analyses of each application, alternatives exist against which document image processing technology can be weighed.

Work in progress. To save time and distribute the high cost of devices over more steps in the process, externally generated documents should be converted into images as soon as they enter the mailroom. Attempting this does make risks associated with the document and index capture subsystem more significant, however. Here, throughput is less a function of per-document scan time than of paper movement and cognition time for determining and entering index values.

Furthermore, although a number of vendors would argue the point, network capacity has to be a consideration if the intention is to have work-in-progress applications share the same network with ongoing office automation applications.

Network protocols and operating systems can be fine-tuned to achieve throughput approaching their physical bandwidth. However, when it is necessary to move a mixture of small, character-encoded files and large image files, a network's effective throughput is greatly diminished.

The complexity and cost involved in using document image processing technologies for work-in-progress applications make it worthwhile to at least consider some competing alternatives.

In situations in which transactions originate from actual or potential trading partners, electronic data interchange is a worthy alternative. Also, where individuals are initiating transactions from predictable locales, they might as easily and as cost-effectively be provided with either personal computers and intelligent forms software or point-of-entry devices that are designed to accept and process handwritten input.

Still another alternative may emerge when the fourth generation of facsimile machines becomes available. That would be to decentralize data capture by having the originator digitize the document using a fax machine.

Image-aided data entry. There are several likely purposes for which a company may consider image-aided data entry. Two of the more common ones are replacement of keystroking as the input step for an existing database-dependent application and reduction of the cost of indexing document images in a storage and retrieval or work-in-progress application.

In the first case, the main technical consideration is the percentage of characters that can be correctly identified without encountering the risk of false substitution by the recognition engine. In some recent cases, the break-even point for use of image-aided character recognition with keyboard intervention as a backup has been as low as a 60% recognition success rate.

Where image-aided data entry is intended to reduce the cost of indexing, the technical issues are not only error probability but processing load and the delay imposed by the recognition step.

Item processing. Item or transaction processing introduces two complicating factors: The volume of incoming documents is incredibly high, and each document has a time value. This means that, in addition to all the technical requirements needed for other types of applications, a document image processing system in this environment must be able to provide both extremely rapid paper movement and absolute system availability.

Knowledge-worker augmentation. It is at this level that document image processing and document publishing will intersect.

Although eagerly anticipated by potential users in fields such as litigation support, government policy formulation and medical research, this application of document imaging has not yet been achieved. The way it works, in theory, is that by mapping a document image to its character equivalent, the user could be provided with a sophisticated search path to information using "fuzzy logic."

Although some sophisticated retrieval mechanisms currently exist, none can be used with ease except by those acquainted with Boolean logic or the mysteries of hypertext stacks. •

Menta is president of Opti-Menta, a consulting firm specializing in image and information resource managment.

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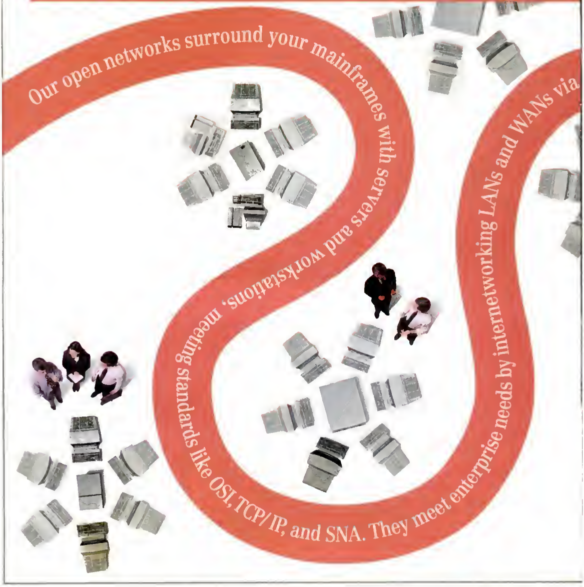

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Limitations

Continued from page 105

This type of network also generally offers greater throughput and faster transmission technology so that imaging and other bandwidth-intensive applications can be supported. Even so, standards and technologies are in a fluid state. This means that users must work to fit the new technology into an enterprise network that is still evolving. It also means making sure that, in the process, they do not lock themselves into any undesired technological or communications bottlenecks.

To ensure that an imaging application will run with sufficient performance over large, highly utilized networks, planners must consider the size and magnitude of image files being transmitted and plan their choice of networking technologies accordingly.

LAN/campus limitations

Emerging LAN and campus-area technologies such as Fiber Distributed Data Interface (FDDI) provide the raw bandwidth necessary for multimegabit file transmission at subsecond rates. But established protocols such as Ethernet and token-ring are not as efficient at handling large files such as images.

Ethernet supports 10M bit/sec., but associated network management overhead, collisions and access contention can reduce the throughput for data by more than 50% in some circumstances. The average scanned paper document, at 50K to 100K bytes, may take upward of one second to transmit over a fully loaded Ethernet, and medical images or photographs of 2M to 5M bytes can take more than 45 seconds to transmit.

Token-ring networks have a greater overall speed at 16M bit/sec., but actual network throughput is also lower because of network overhead.

Bridging technology has improved markedly in recent years in response to demands for FDDI bridging of Ethernet and token-ring LAN traffic. However, current LAN bridges do not support high-speed bridging such as FDDI-to-FDDI, and all bridges introduce an element of network filtering and forwarding delay that must be considered when planning multi-LAN networks.

To support volume image traffic over a wide area, the backbone portion of the enterprise network requires at least T3 (45M bit/sec.) speeds. T3 technology, although currently available as a dedicated offering, is not as widely deployed as low-speed T1 technology, and T3 private network products, including T3 multiplexers, are still relatively new and expensive.

Emerging offerings, such as AT&T's Switched Multimegabit Data Services, promise to offer high-speed T3 and higher switched access to users in metropolitan environments. At present, however, users' options for high-speed wide-area transmission are limited and expensive.

- **Workstation capacity.** High-throughput transmissions can also become stalled at the workstation level, introducing delays in the process. Data transmissions over Ethernet and token-ring-attached workstations can be limited by interface cards, workstation hardware or application bottlenecks. The transmission of image files over higher bandwidth LANs such as FDDI is also limited by the lack of hardware that permits workstation-to-FDDI connectivity. Commercially available workstations do not have the capability today to directly interface to data at FDDI rates.

As workstation receptivity to higher bandwidth networks improves, users will have a greater range of networking alternatives available from which to choose.

- **Proprietary imaging protocols.** Even with the bandwidth to provide timely connectivity of image resources, interoperability quickly becomes complex without a common imaging protocol.

CCITT Group III and Group IV protocols provide a lowest common denominator format for transmission and receipt of documents, but as the imaging field develops further, industry-standard protocols for financial services, health care and other industries will need to be addressed.

Until the future comes

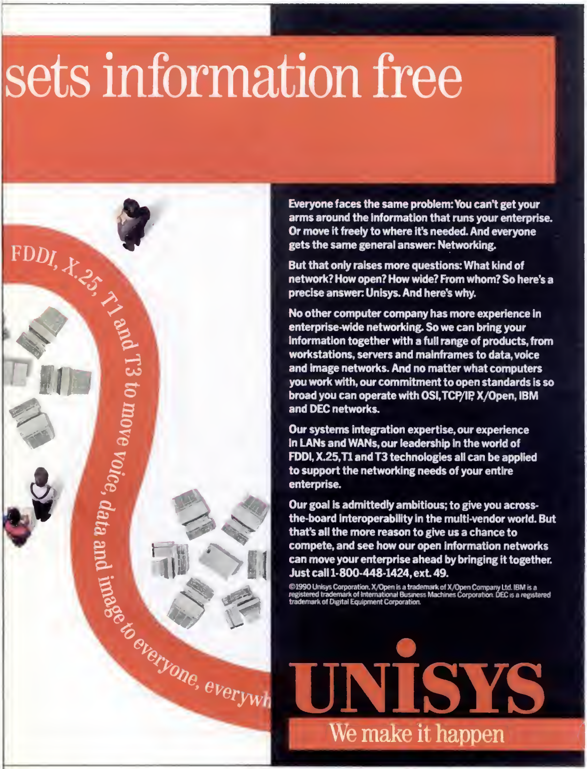
While there are technical gaps that prevent an easy solution to the use of imaging in enterprise networks, interim solutions can be developed that prepare users for future functionality while providing desired capabilities today.

Where response times on the order of seconds are acceptable, high-capacity workstations and fast LANs and wide-area networks are not required. In many cases, it is sufficient to prepare for the faster technology by wiring high-speed fiber media today and using slower protocols and workstations until it is technically and economically feasible to upgrade.

The use of mass storage devices and high-speed LANs to store most locally required images reduces the need for the exchange of images across wide-area facilities, and batch updates of image files ensure the timeliness of information locally. Distributed client/server applications that provide both local access to image data and access to images across an enterprise network also minimize enterprise network activity and response times.

The hitch is that current implementations may not easily migrate to future standards. Careful planning is needed to ensure that what works today will also support tomorrow's requirements. •

Banerjee is a manager of the Network Strategies Practice at Ernst & Young in Vienna, Va. His areas of consulting expertise include enterprise network strategic planning, imaging technology and broadband technologies.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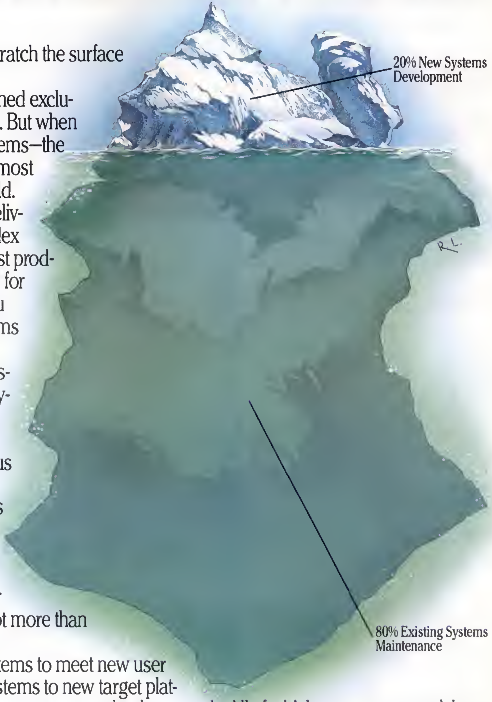

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Group(ware) therapy: Tips for success

BY PAUL GILLIN
CW STAFF

Each day, the 650 employees of The Balcor Co. go to work in 275 locations around the country and begin chatting with each other as if they were right next door.

The conversations consist mostly of key clicks. Balcor employees are linked through an electronic mail network that can channel their discussions along preset lines, file their notes and comments automatically and even remind them when it's time to answer a question.

The key to the whole process is groupware, a small class of software products that takes common single-user functions — such as calendars, word processors, databases and notepads — and wraps sophisticated multiuser communications around them. The idea is that by building on thoughts and actions, the whole group will be better than the sum of its individual members.

"People are focused on producing action, not just sending information," says Stuart Bard, vice-president of office automation at Balcor, a real estate company based in Skokie, Ill. Because groupware forces users to define what they want to say, he adds, "we don't get the kind of unclear communication that leads to miscommunication."

Fans say that groupware's broad-based networking is an ideal fit in flat, decentralized structures.

"The changing culture has mandated [groupware] products," explains Craig Dupler, an automation manager at Boeing Aerospace Electronics in Seattle. Boeing Aerospace uses Higgins, a groupware product from Enable Software, Inc. "If you don't do something like Higgins, you won't be around tomorrow," Dupler says.

A small group

Unfortunately, Boeing and Balcor, which uses a groupware package called The Coordinator from Action Technologies, Inc. in Alameda, Calif., are part of a fairly small cadre of companies that have successfully implemented groupware. Groupware experts say more groupware projects fail than succeed because users frequently do not know how to implement technology that so dramatically affects established communication paths. "Successful groupware is a rare occurrence," says Gerald Michalski, a vice-president at New Science Associates, Inc., a market research firm located in Mountain View, Calif.

A March 1990 MIT study of 25 groups found that people, not technology, presented the biggest problem.

"We sometimes saw well-designed tools not being used because of lack of group agreement or because the organization didn't support it," says Christine V. Bullen, assistant director of the Center for Information Systems Research at MIT and co-author of the paper with John L. Bennett.

Still, there's hope. Experts point to a number of critical success factors that potential users should consider if they want to get the most out of groupware:

- **Prepare the organization.** Installing groupware without getting the organization ready is a one-way ticket to failure, many agree. Most

James Kaczman

Continued on page 110

Playing it safe in Peoria

Careful practices and branch integration keep Talman S&L afloat in trying times

INTEGRATING
THE
ORGANIZATION
Talman Home Savings and Loan Association

BY MICHAEL FITZGERALD
CW STAFF

The words "thrift" and "collapse" have become the Romeo and Juliet of finance — you can't think of one without the other. But despite the industry's crisis, some healthy financial institutions continue to look to the future and are even implementing major new systems.

A good example is Talman Home Savings and Loan Association in Chicago. Talman, a $6 billion thrift that was founded in 1922, continues to turn a profit despite the current S&L crisis because of careful management, according to analysts.

Talman is now 75% done with an enterprisewide, fully integrated network for its 51-branch operation in the Chicago metropolitan area and Peoria, Ill.

The thrift "is pretty conservatively run," says David Hochstim, equity analyst at Bear, Stearns & Co. in New York. "They don't take risks in lending, and I think they wouldn't take risks with systems."

Conservative does not mean timid, however. A mid-1980s restructuring of the S&L's business strategies prompted a simultaneous study of how information systems could better suppport the planned new business structure.

Now Talman's 85-member IS staff can "deliver to a single point access to disparate systems and storage media [containing information] for existing customers," says Jim Wegmann, Talman's Corporate EDP and Systems Division senior vice-president.

That single point of access is a mortgage specialist or a retail banking specialist who, using a personal computer, can access any customer file in any of Talman's systems.

Customers can also do several transactions themselves, such as account transfers, via Talman's automated teller machines (ATM). Wegmann says Talman intends to expand its ATM services, but the institution is still planning its offerings. These services will be offered through the coming year.

David Joel

Wegmann: *Bringing customer information to neighborhood banks*

Wegmann says he has put a lasting computing architecture in place that will allow Talman to avoid capital-intensive system makeovers.

The driving philosophy behind the IS effort, Wegmann says, keeps with the thrift's unofficial credo: "The only way to survive in the banking world is to aggressively be the best, least-cost provider of the best quality services — that's how you win."

The thrift's networking push has required the IS department to gut its former systems effort. In place at the

Continued on page 116

Continued from page 109

importantly, the people who will be using the system should be predisposed toward working with each other in the first place.

"Companies that have a collaborative attitude will be able to get loads of power out of groupware," New Science's Michalski says.

"Companies that are very competitive internally have a hard time because groupware brings a lot of [negative] stuff to the surface," he adds.

Richardson, Texas-based MCI Telecommunications Corp., a subsidiary of MCI Communications Corp., has long been a heavy user of E-mail and saw groupware tools as a natural extension, according to Brian Plackis, a local-area network manager at MCI. The company says it expects to have 300 users of Lotus Development Corp.'s Notes groupware system by the end of the year.

"Your company needs to realize that there's a need to communicate with other parts of the organization and that the tools it has aren't good enough," Plackis says.

Bullen's *MIT report cites people problems*

Getting that commitment isn't easy, especially when it comes to changing the way people work together. "The technology has to sit in a group where people are all committed to using it, and that's hard to find even with single-user applications," according to George Goldsmith, president of The Human Interface Group, Inc. a consulting firm in Wethersfield, Conn.

"It's clear that unless there's a group commitment to doing this, it's not going to help very much," MIT's Bullen says.

- **Find a pilot project.** Groupware works best when it's implemented in stages. This is true for two reasons: The technology is easier to manage in small groups, and it works best when groups are oriented toward a specific project. In fact, some of the technology's greatest strengths — project management, meeting schedulers and E-mail aids that specify desired actions — are most helpful when everyone is pulling toward a common goal.

Boeing Aerospace installed Higgins when it created a business group to engineer a piece of a defense project. As a result, people didn't come in with a lot of preconceptions about how they should interact, Dupler says. The company also tested Higgins in a five-person group for more than a month before expanding its horizons.

Balcor initially installed The Coordinator in its acquisitions area to improve communications among a widely dispersed group. Now, the company has 650 users in 275 locations.

- **Get top management commitment.** That's important in any computerization

Group effects

Groupware can have unanticipated effects on an organization, especially in the way people deal with each other away from their terminals, users say.

"You're talking about changing the way people interact, affecting the power relationships and making explicit very implicit relationships," says Gerald Michalski, a vice-president at consultancy New Science Associates.

Groupware forces people to focus their statements and be more specific about the actions they expect in return. That tends to expose the laggards in an organization who refuse to participate.

"It makes apparent the already existing communication breakdowns between people, including how people often don't communicate with each other," says Stuart Bard, vice-president of office automation at The Balcor Co., a real estate firm based in Skokie, Ill. "It becomes very clear who tends not to make strong commitments, because they never make requests or offers over the system."

Some users say meetings go more smoothly after an organization gains groupware experience. "When a lot of work is done outside the face-to-face exchange, the meetings can then focus on outcomes," says Christine V. Bullen, assistant director of the Center for Information Systems Research at MIT and co-author of a recent paper on groupware.

Users in general say groupware doesn't cut down on the amount of human interaction in their organization but does reduce the time they spend chasing down co-workers.

"It doesn't replace the telephone, but it makes sure people get the message," says Craig Dupler, an automation manager at Boeing Aerospace Electronics in Seattle. "That whole class of communication is done much more effectively by the system."

PAUL GILLIN

1990. The missing
north of New York

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This application heralds the introduction of a new concept in network management called the NYNEX ALLINK Network Management Solution. It will become a seamless, integrated network

project but absolutely essential with groupware, users say. In most successful groupware installations, it's an executive who decides to install the package in the first place, they add. Once the boss is on line, others follow. Boeing Aerospace, for example, disseminated its Higgins groupware system to 550 people on a defense project team by making its first user the manager of the program.

"We had to make it that executive's No. 1 tool," Dupler says. "Once everybody recognized that this was how their boss was talking to them, [resistance] went away."

At MCI, management was already predisposed toward electronic communications and has pushed the Notes experiment through. Plackis draws an analogy to the organiztion's MCI Mail, which is currently one of the busiest internal E-mail systems in the world. "It wasn't till the executives said, 'we're only going to use MCI Mail to communicate' that people began to use it in force," according to Plackis.

Michalski: *Successful groupware is rare*

• **Don't try to change the process.** You don't want to subject users to an upheaval in their work routine or a blitz of complex new technology, experts say. If the groupware product doesn't mimic the way people already operate, they probably won't learn it.

"People report the most value from tools that parallel their nonelectronic activities," according to Bullen's MIT report.

The most popular groupware feature by far is E-mail, because it improves on an existing communciation process that and virtually eliminates missed communications, according to the MIT study. With The Coordinator, "I spend more time planning and managing and discussing and less time playing phone tag," Bard says.

Calendaring, on the other hand, is a mixed bag. Higgins users like the fact that the entire product is oriented around a calendar function. "It really has the right idea," Dupler says. Even so, calendaring can still turn out to be a dud in organizations that aren't as personal computer-intensive.

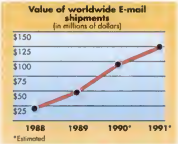
"Most people have a calendar they carry with them, a calendar on a machine and a group calendar where people can book other people's time," Goldsmith says.

Faced juggling multiple calendars, some users will simply opt not to use the electronic version at all, he adds.

Computer conferencing, which links messages together by topic, is one of the most potentially valuable but least used groupware functions, according to Bullen. The reason is that the process of linking messages often isn't intuitive, so users simply skip the option and revert back to using E-mail.

Check's in the mail

Electronic mail, which includes groupware applications, is expected to grow at a 21% clip over the next four years



Source. International Data Corp. CW Chart: Paul Mock

Groupware experts say you shouldn't worry if all the packaged functions aren't used. A single feature that improves communication could more than justify the expense.

• **Resist the urge to cost-justify.** The benefits of groupware lie in clearer communication, quicker decision-making and faster responses, users say.

Unfortunately, these qualities don't translate well into dollars and cents. That's a problem for software that can run into the tens of thousands of dollars before it shows any real productivity benefits.

Because the benefits are so difficult to quantify, experts say it is doubly important that users and managers sign off on groupware before the IS department goes shopping.

Benefits exist

However, the benefits are there. Users say groupware leads to clearer communication and faster turnaround time. By eliminating telephone tag, "there's an incremental time-savings that's spread over the whole organization," Dupler says. His company has been able to more than halve its secretarial support needs by cutting the need to take messages and manage schedules.

Westinghouse Trading Co., a user of Wang Laboratories, Inc.'s Freestyle imaging system, which has certain features for group document annotation and E-mail, has cut down on the time needed to process an order by reducing the amount of time that papers sit on users' desks. According to Operations Manager Harry Bolan, the cost justification isn't in reducing the cost of processing transactions, "it's in reducing the time. That gives me a competitive advantage, the kind that comes back to you in a lot of other ways." •

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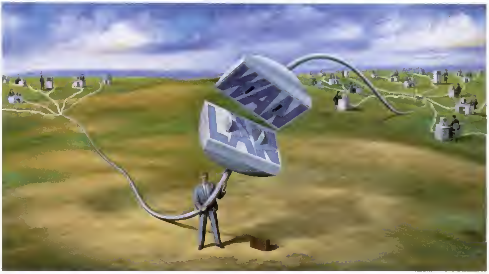

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F.Y.I.

St. Louis-based **McDonnell Douglas Systems Integration Co.** merged two business units. Reason: Both pursued similar markets. Communications Industry Systems and Built Environment Technologies were combined. New $120 million unit has 600 employees.

More Digital Equipment Corp. happenings:

- British retailer **W. H. Smith** and DEC have signed a five-year, $2.8 million outsourcing contract. DEC will supply and run the company's network.
- **Kapiti, Inc.**, UK-based supplier of trading room and wholesale banking systems, will integrate **Financial Information Systems Toolkit** with **Dectrade**, DEC's trading system platform.
- A $2.7 million campuswide fiber-optic DEC network was acquired by **Detroit Oakland University**. System will connect 16 buildings on campus.
- DEC also introduced **Decomni/VMS** network interface, implementation of Open Systems Interconnect Manufacturing Message Specification. Decomni/VMS lets VMS applications speak with various vendors' plant floor devices.

Tex/Con Oil & Gas Co. in Houston awarded Charlotte, N.C.-based **Network Computing Corp.** a 2½-year contract for a computing environment consisting of a high-speed digital T1 link between Charlotte and Houston.

Oracle Systems Corp. announced Preferred Systems Integrator Program. Part of U.S. sales and support organization, effort will focus on client/server integration. More than 46 resellers have joined program to date.

From **Metropolitan Fiber Systems** (MFS):

- New five-year lease with the **Chicago Board of Trade**, largest U.S. commodity exchange.
- **City of Dallas** inked 10-year franchise agreement. MFS will build, operate fiber-optic communications system to serve Dallas business customers and long-distance carriers.

Sales of **high-speed private network equipment** (T3 and higher) are expected to grow fifteenfold by 1995, according to recent study by **The Yankee Group**. Boston-based firm predicts sales will climb from $18.3 million in 1990 to $261 million in 1995. Yankee Group also predicts that customized carrier-based network offerings will become norm.

Network Peripherals, Inc. announced two network interface boards connecting individual workstations or servers to 100M bit/sec. Fiber Distributed Data Interface network.

Market Intelligence Research Corp. in Mountain View, Calif., reports:

- World office local-area network revenue to hit $27 billion by 1996, up from less than $2 billion in 1986. Two causes: Popularity of unshielded twisted-pair cable and need to connect different hardware, operating systems and communications protocols.
- Total market for IBM's **Systems Application Architecture** software pegged at $3.1 billion in 1990.

Hewlett-Packard Co. and **Pacer Software, Inc.** announced Apple Computer, Inc. Macintosh connectivity for HP 9000 Series 300 and 800 workstations and minicomputers with Apollo workstations.

Mentor Graphics Corp. and **Applied Microsystems Corp.** agreed to integrate development tools. Companies plan to integrate Applied Microsystems' EL series emulators and Mentor Graphics' Codelink computer-aided software engineering products.

Softech, Inc. in Waltham, Mass., software and systems integration provider, will acquire **Information Decisions, Inc.** in Grand Rapids, Mich. Privately owned IDI is systems integrator, independent value-added reseller of LAN products and services. Customers include Whirlpool Corp., Amway, Gerber Food Products, General Motors Corp. and Electronic Data Systems Corp. Terms not disclosed.

Telwatch, Inc. in Boulder, Colo., will develop interface between AT&T's Accumaster Integrator and Netexec intelligent network management system. Netexec to support AT&T's Unified Network Management Architecture, a blueprint for management and control of voice and data networks.

New report on open systems by **DMR Group** says standards-based architectures will prevail in 1990s. Most vendors base their product strategies on IBM's Systems Application Architecture and open systems.

Simware, Inc. became first connectivity software company to win government's **Canada Award for Business Excellence.** Ottawa-based Simware honored for **Splitsecond** software, which speeds data communications between mainframes and remote laptops and PCs.

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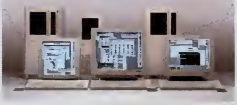

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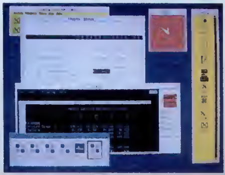

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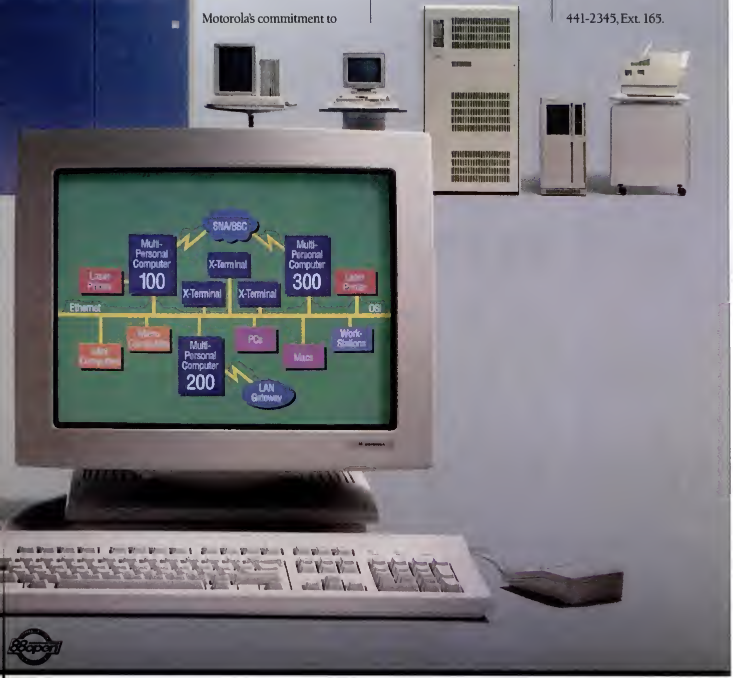

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Continued from page 109

Close-up

Organization: Talman S&L.
Goal: Create an architecture that will avoid costly system makeovers.
Strategy: Establish a network connecting its 51-branch operation to give officials a single point of access for all customer files.
Payoff: Better customer service.

start were four unintegrated batch-oriented service bureau systems, largely IBM 3033s and ISC Systems Corp. 8 Window products. The 3033s supported Talman's retail operations, and the 8 Window products supported teller activities and retail liability platform sales.

Talman also built a new data center within the Citicorp Information Resources (CIR) data center in Arlington Heights, Ill. CIR became Talman's back-office service bureau, and the thrift shut down its on-site data center and closed out contracts with four service bureaus.

Talman has negotiated a special relationship with CIR, wherein "we effectively share facilities costs, disaster recovery costs and administrative costs. But Talman maintains total control" of its applications, which run remotely at the Arlington Heights data center on an IBM 3084 QXC mainframe running MVS/XA under CICS, Wegmann says.

Wegmann and his team (which numbered as high as 240 at the project's peak) also reworked the telecommunications network, ripping out an asynchronous network to replace it with a full Systems Network Architecture bisynchronous architecture. The staff installed redundant T1 lines and built a switching facility to connect Talman to the data center and its branches. Each branch is connected to the system via a 9.6K bit/sec. leased line, which runs to a 56K bit/sec. concentration point and then to the T1 lines into the switching facility.

Within Talman and its branches, tellers and officers use NCR Corp. PCs based on the Intel Corp. 80286 and 80386 chips and using Micro Channel Architecture.

Wegmann says that installation of new hardware will give his systems future flexibility because the architecture is integrated both vertically and laterally. This means that customer information can be shared across business lines. It also means that sales and service business can be conducted in a branch while having full access to host-level systems.

Wegmann says he expects the system configuration will hold up well in the future, because it runs within a Systems Application Architecture-type environment, using the host mainframe as an information repository.

The 18-month shift away from the old system has been a boon, Wegmann notes.

"From a technology standpoint as well as a business standpoint, [the old system] was very constricted and actually damaged the efficient, cost-effective conduct of business," Wegmann says.

"What it basically boils down to is that [we've] restructured operations and systems support architecture to support a more robust sales culture," he says.

Better service from even the smallest branch office clearly increases the potential for happy customers. As for cost savings, Wegmann says, integrating all the systems will essentially pay for itself.

Change of this scope presents a risk for a corporation, and Wegmann is well aware of the consequences.

"If we blow it, Talman has to write off the cost of the mistake," he says.

"What it means . . . is that you'd damn well better understand . . . that the decision you make must be right the first time, because you will not have a chance for a second time," Wegmann says. ●

Talman's tech traits

Talman's PCs are hooked into the mainframe via Motorola, Inc. 68040-based NCR Tower 400 and 600 servers running AT&T Unix System V, Release 3. Files are converted from DOS to Unix through NCR's Branch Integration System software bridge.

Talman is standardizing on OS/2 Presentation Manager and Microsoft Corp.'s Windows Version 3.0 on the desktop. It has started installing Windows 3.0 and Presentation Manager running under Microsoft's OS/2 Standard Edition on the administrative side of the operation and will move to IBM's OS/2 Extended Edition for its systems work, where Wegmann says the secured multitasking offered by OS/2 will be valuable.

The thrift is now beta-testing OS/2 Extended Edition Version 1.3 on its systems, and Wegmann says Talman will probably not finish switching to OS/2 until 1992.

Major application packages in use include Computer Associates International, Inc.'s Infopoint/SSI, which is used to track retail banking business and safe-deposit box business, deposit accounts, installment loans, teller activity and customer profitability, as well as its online customer information files. Talman also uses some McCormack & Dodge (now Dun & Bradstreet Software) financial packages.

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TYING IT TOGETHER

Jacklyn Popiul

How good is your image?

Records management has long been considered a poor relation of information systems. And to many businesses and government organizations, it still is.

But that's just not smart. Imaging is popping up all over the IS domain. In fact, some of the new electronic document systems can be so integrated with other information resources that users don't even know whether information is stored as data or a document image. The information appears on the screen — and only the software knows where its been.

The fact is, integrated imaging management needs IS respect. It's sad, but a negative approach to document-based information has kept files in the basement and many records management professionals out of the corner office.

The more complex electronic document management systems require a level of sophistication equal to that found in IS operations.

Companies must leave decision-making and cost approval for integrated imaging systems to the right people — those qualified by knowledge, not by title. Firms can't afford to rely on advice from IS people with little more understanding of the mechanics of the integrated imaging system than they have of its purpose.

In practice, this means that the imaging professional would report directly to the chief information officer or equivalent. In this structure, the following two things will happen:

- The company or government agency will attract the highest quality imaging professionals available.
- They will have a positive impact on the organization's bottom-line profitability.

Imaging systems permit the kind of real-time access to information (and much of the manipulation) that is possible with data systems. The information on those documents — and, therefore, the people responsible for maintaining and providing that information to decision-makers — have a whole new value for the organization.

Imaging systems are only tools. The key to any system is people: those who select, operate and benefit from the system. Electronic imaging systems require a new breed of highly trained and motivated information management professional. Where can you find such people? Frequently, they are right under your nose.

The high productivity of the new image systems — faster access times, lower production costs, timely decision-making — makes it possible to offer higher pay to operators than is traditional in paper or microfilm environments. Paying professional-level wages makes it possible to attract professional people.

One of the more intangible benefits of installing an electronic imaging system is the effect it has on the morale of the corporate records department personnel. They stop thinking of themselves as file clerks and begin thinking of themselves as information professionals.

Usually highly motivated by a desire to meet the information needs of user departments, the self-esteem of these people greatly improves when they are more able to meet those needs.

Even more important than the question of morale and motivation is the fact that image management people understand how information is used. They understand the informational needs of user departments utilizing document-based information, as well as the needs of external users such as auditors, government agencies and the like.

In fact, image management people are ideally placed to assist in the implementation of an enterprisewide solution to document management needs. Frequently, user departments will get fed up with paper and implement a new system on their own. Too often, they assume that their needs are unique and not fully understood by outsiders, but actually, information needs are remarkably similar from one application to another. The experience of information experts can be very valuable in assisting user departments to design a system that is both productive and economical and one that is compatible with other systems throughout the organization.

Of course, the involvement of IS in the design of the system can be helpful, particularly if the document system is to be integrated with other corporate information systems under IS control. The technical expertise of the IS staffers can also be valuable in making certain that hardware and software work toward meeting system requirements. Those requirements, however, are best defined by those with an understanding of the information needs of the user: namely, image management professionals.

These three groups — IS, image management and users, with the cooperation of vendors and upper management — should be able to design and implement the best possible system for the organization. ●

Popiul is a vice-president at First Nationwide Bank in Daly City, Calif.

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A 911 for Dallas systems

An emergency with the police dispatching system yields a bonanza for public safety

INTEGRATING NEW TECHNOLOGIES

City of Dallas

BY KATIE CRANE
SPECIAL TO CW

Back in 1984, David Morgan, director of information services for the city of Dallas, was between a cop and a hard place.

The police department's $20 million radio dispatch system routinely jammed, and plagued by transcription errors, the system forced frustrated officers to wait to send and receive important information. A tightfisted city council — under heavy pressure to keep taxes down — was unlikely to spend another $20 million for a second radio system.

"We had to do something," Morgan recalls. "My users carry guns!"

The solution: a five-year, $10.5 million project that integrated several key public safety systems. Today, Dallas boasts a 911 emergency call system, cellular cruiser telephones, mobile data terminals (MDT) in every squad car and a $4 million automated fingerprint identification system (see story below).

Paid for by telephone charges, budget money, taxes, grants and confiscated drug money, the integrated system should be put to good use: Dallas is the seventh largest city in the U.S., but it is the nation's leader in violent crimes.

The integrated system links the city's main dispatching system running on an IBM 3083E mainframe to the phone company's DTI 911 switching equipment via AT&T network interfaces.

Now MDTs ride in every Dallas police car beside a radio and a cellular phone. The terminals, provided by Mobile Data International, Inc. (MDI) in Vancouver, B.C., have automatic access to all incoming 911 and other dispatch information as well as state, regional and federal information files.

One Dallas public safety official estimates the new integrated system has improved police productivity by 40%.

City councilor Jim Buerger, who chairs the Public Safety Committee, says having the patrol cars outfitted with MDTs is "absolutely invaluable" in improving the police officers' response time.

The system has also helped put Dallas on the map in a different way. Morgan and his team recently received the 1990 Society for Information Management (SIM) Partners in Leadership Award.

Tom Morin, vice-president of information services at Medtronic, Inc. and chairman of the SIM award committee, lauds Dallas' dedication to service, enthusiastic user response and the system's impact. "That extra 30 seconds can save lives," Morin says.

The project was the largest ever tackled by a Dallas information systems department — and perhaps the city, Morgan says, adding that there would have been horrendous political consequences if the project had not gone smoothly.

Stan Wolenski

Dallas' Morgan *answers a radio crunch with integration*

In this city of 300 square miles, the 3,000-member police department fields 6 million telephone calls and makes 640,000 runs each year. Citizen contacts are up by 2,000 per month. At the same time, Morgan's IS budget has dropped $2 million (down from $22 million in 1986), and he has shrunk his staff by 32 since 1987.

Selling the system to the city council could have proved difficult — but wasn't. Morgan convinced the council to hold a nonbinding referendum on the 911 system in the 1985 city election to see if the public would pay for it. Eighty percent of the voters said they would pay as much as 25 cents per month on their phone bills for the service. (The actual cost today is 20 cents per month.)

With what they saw as an "overwhelming mandate" for 911, the city manager appointed Morgan to head a steering committee to go forward with the system.

No cop-out

The police department already had a sophisticated dispatch system with two well-established databases of beats and squad cars. Morgan knew it was technically possible, using various protocols and electronic interfaces, to link city computers with Southwestern Bell's computers so that every 911 call automatically displayed the caller's location.

"But the phone location doesn't do much good unless you know what police beat it's in and which police car is assigned to that beat," Morgan explains. "If you put the three together automatically, you've got a big

Close-up

- **Organization:** City of Dallas.
- **Goal:** Integrate various public safety systems.
- **Strategy:** Give police access to information via a mobile data terminal, cellular phone and ties to the 911 system.
- **Payoff:** Police productivity improved 40%, citizen contacts up by 2,000/mo., and suspect identifications doubled to 16,000/mo.

Pointing the fingerprint

The Dallas police department's newest crime fighter is AFIS, a $4 million automated fingerprint identification system from NEC Information Systems, Inc. in Boxboro, Mass. AFIS is an on-line fingerprint image system that runs on an optical disc and produces a short list of suspects for examiners to review by matching prints mathematically with those in Dallas' database.

Since the system went live in July 1989, the police have doubled suspect identifications and tripled the productivity of the department's identification division — all without adding any fingerprint examiners.

Jim Buerger, chairman of the Dallas City Council's Public Safety Committee, speculates that the 16.7% drop in Dallas' burglary rate during the past 11 months may be partially because of AFIS and mobile data terminals in police cruisers.

There have been some dramatic examples of success. For instance, it took less than one minute for the Dallas police to peg the "North Dallas coat-hanger rapist," whose moniker came from the way he bound his victims.

Using AFIS, examiners in the identification division matched a fingerprint found months before at the scene with a suspect's print, one of the 2.8 million individual fingerprints in Dallas' 280,000 fingerprint files. The suspect — who later had 14 other rape and burglary charges filed against him — was indicted, convicted and given a life sentence.

A somewhat less dramatic payoff than this so-called cold search are the searches for pending warrants performed immediately after a suspect is arrested. "Sometimes the patrol officers stop by with the suspect in tow on their way to jail," explains David Morgan, IS director for the city of Dallas.

AFIS, which is fully integrated with the city's other criminal investigation systems, has reduced the time it takes to perform these routine searches by 25%.

For the six-year period before AFIS was installed, detectives averaged about 35 identifications per month; today, they average 120 per month, more than a 300% increase.

KATIE CRANE

bonus," he adds.

Today, a citizen can dial 911 and speak to a dispatcher. The call is traced by a telephone company computer so that the caller's exact location appears on the dispatcher's screen. The dispatcher keys in the caller's complaint, and the mainframe automatically funnels the message via an 800-MHz radio frequency to a terminal in the squad car nearest the caller's location. An officer no longer needs to stop the car to write down any information; it automatically appears on the terminal screen in the car. If there are any questions, the officer en route simply picks up the cellular phone and calls the citizen.

There were other advantages to integrating: giving the 2,500 uniformed police officers direct access to state, regional and federal files, linking an automated fingerprint information system to other criminal information systems and installing a similar system in the fire department at very little additional cost.

> "YOU DON'T FORGET 8½ years in a patrol car. I just kept asking over and over: 'If I'd had this, what would I want?' "
>
> LT. JAKE MOORE
> DALLAS POLICE DEPARTMENT

Once funding had been approved, launching the integrated system was a big technical and political challenge.

Morgan first selected a team to oversee the design, implementation and acceptance of his ideas. He then enlisted the help of Assistant Police Chief Leslie Sweet and Kenneth Knotts, Dallas' deputy fire chief and commander of the communications division, whose department would also be tied into the system.

Morgan selected data, radio and telephone experts from his own department and invited representatives from the city attorney's office, the city auditor's office and Southwestern Bell to participate in the steering committee.

Assembling the project team proved to be a delicate process. "Police officers and firefighters like to take potshots at each other," Morgan says. "The police claim the firefighters are always playing ping-pong at the fire station, while the firefighters complain that the police invent emergencies just so they can play with their lights."

Sweet kept his eyes open for enthusiastic people close to the field officers. Once he made his selections, Sweet handed over all decision-making authority. He reassigned two police lieutenants who had worked in the field and asked only that they keep him briefed.

"You don't forget 8½ years in a patrol car," says Lt. Jake Moore, who worked on the project. "I just kept asking over and over: 'If I'd had this, what would I want?' "

Planners discovered that no single vendor had an overall understanding of radio, telephone and computer integration. "They'll tell you they have the experience," Morgan says, "but they don't have the depth in all three areas to integrate them."

The team approached several contractors and systems integrators hoping to find help, but the cost to build a specialized systems integration team was 35% higher than that of staying with the staff. Morgan concluded that the most cost-effective way to do the job was in-house.

That decision required a massive reorganization of his department. Telephone, data processing and radio groups were combined, but problems remained. "The data people didn't speak radio, the radio people didn't speak data, and the telephone people spoke only a little of each," Morgan says. It took quite a bit of internal effort to get everyone thinking and speaking the same language.

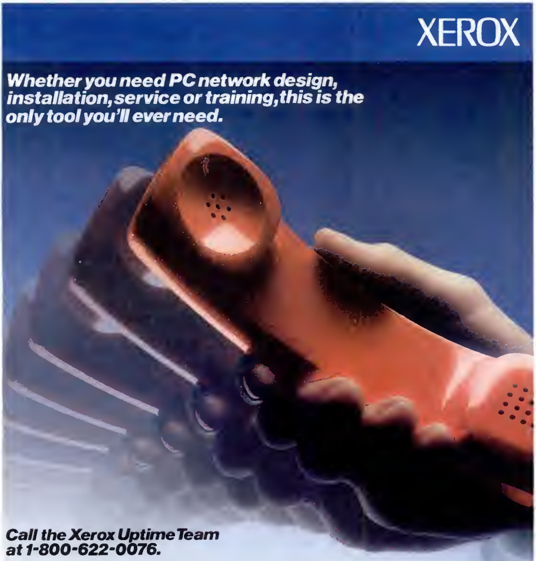
The planners labored over thousands of details and faced hundreds of decisions about the functions and layout of the squad car terminals — even down to the colors of the screen (the officers wanted

Creative funding

In tough fiscal times, especially at the city level, finding money for big IS projects can be tricky. The city of Dallas used several novel funding approaches:

- **911. It cost Dallas $3 million to implement and $1 million per year to operate. Residents get a 20-cent service charge on monthly phone bills.**
- **MDTs. Cost $3 million — $750,000 came from a state grant, the rest from city budget money. Included in the $3 million was the $50,000 it took to modify the dispatch software and the $50,000 to develop a message switching system between Southwestern Bell and the DPD dispatch computer.**
- **Cellular phones. Cost $400,000 for the first year, $275,000 for the second year. Paid for with confiscated drug money.**
- **Fingerprint systems. Hardware and software cost $4 million but will amount to $5 million over five years with interest. Funded with general tax dollars.**

KATIE CRANE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yellow) and the letters on the tab keys (a flat off-white to cut down on the glare).

Personalities clashed from time to time. "We had quite a big fight over terminals," Morgan recalls. The system with the best radio properties was not the most user-friendly, so it forced the group to make some hard choices. In the end, Dallas selected the friendliest terminal, which also happened to be the low bid, he says.

Moore says the MDTs chosen were not only friendly; they were also "downright user-promiscuous." He adds: "It didn't take long for word to spread that these were the greatest things since canned beer."

Morgan remembers the planners meeting five to six hours per week to have the 911 system up on 1 million telephones by April 1, 1988. It took 1,200 hours to modify the police dispatching software for the mobile data terminals (MDI's off-the-shelf software was too expensive at $345,000). Another big challenge was linking the telephone company's computer with the city's state-of-the-art systems.

> "THE DATA people didn't speak radio, the radio people didn't speak data, and the telephone people spoke only a little of each."
>
> DAVID MORGAN
> DALLAS POLICE DEPARTMENT

The only disruption of service during the project came when the system had to be shut down at 10-second intervals, but Morgan says he has documentation to prove that it never lost a call.

At the project's peak, Morgan says, 56 people worked full-time on the integration effort, including programmers, telephone technicians, police officers, firefighters and project managers.

High hurdles

The most difficult technical challenge — and the biggest expense — was making the transition to Dallas' proprietary self-correcting 4.8K bit/sec. system from the phone company's start/stop technology. The latter had very little error recovery and sent at a rate of 1.2K bit/sec. through the city's mainframe to the MDTs.

The challenge that brought the system to its knees, however, was testing the queuing theory, which builds intelligence into the switching software to automatically enable a command terminal to switch to less-crowded radio channels when the first channel it tries is loaded.

"When you have 600 terminals coming in over 20 radio sites, coming down to nine inputs and outputs to the computer, the queuing theory becomes important," Morgan explains.

The team worked long and hard to get the algorithms right — even contracting the help of a university mathematician — to avoid the problem of having all the terminals come in on one channel.

After simulating the problem mathematically, Morgan and his team took 20 patrol cars outfitted with MDTs to a field for testing. The system crashed. With two weeks' more work and some help from MDI gurus, they eventually changed the resource allocation algorithm. "It was a matter of fine-tuning," Morgan says.

Training for the new system was developed by the same police officers who sat on the steering committee. They equipped a car, then developed a videotape, a live demonstration and some hands-on exercises. Moore took his "traveling show" to every substation. After that, the in-service officers were calling him every day begging for MDTs.

Terminal case

Installing terminals in squad cars took some 2,400 hours. The city had to convert to cars with bucket seats to accommodate the console. Luckily, it took very little time for officers to get comfortable with the new system. "You can battle it with one finger," exclaims Moore, who says he doesn't type. "Everything's right there in the span of one's hand."

Included in the total cost of the system was $50,000 to modify the city's existing dispatching software and another $50,000 to develop a protocol and message switching system with electronic interfaces between the city and phone company computers.

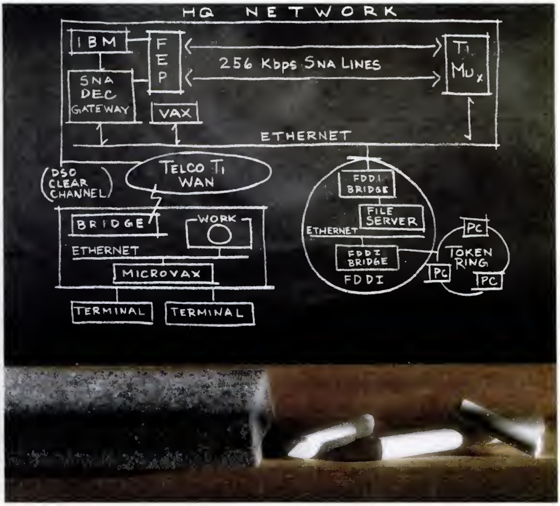
"Our objective was to get the officer through his administrative tasks and back to radio patrol as quickly as possible," he said. A routine check that could have taken as long as 15 minutes before is now completed within five seconds 95% of the time.

Inquiries to the state, regional and federal databases have gone from 240,000 per month to 490,000 per month, while "hits" (identifying a suspect) have doubled to 16,000 per month. Dispatch transcription errors are down 95%. "We've closed the information loop," Morgan says. "We think we're the only city in America that's integrated this process end to end."

Morgan and his team are now installing MDTs in ambulances and fire trucks for the cost of the terminals. "Everything else had been done during the police department installation," he says.

Morgan's users still carry guns, but he sleeps more soundly now, knowing they also have information at their fingertips. •

Crane is a free-lance writer based in Norwich, Vt.



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INSIDE EDGE

A question of support

"After a systems integration project is completed, what kind of support do systems integrators leave behind?"

BOB JOHNSON
Vice-President
Commercial Systems Integration Unit
Unisys Corp. Systems Management Group
U.S. Information Systems Division (USIS)
Blue Bell, Pa.

The key to a successful post-systems integration project support program is to address it in the original project proposal. That way, there are no surprises for the customer or vendor. The customer has a clear understanding of where the systems design, development and installation phase ends and where the follow-on support program begins. This approach also gives the customer ample time to evaluate the post-project operational issues, including training and system maintenance.

CHUCK GIBFRIED
Corporate Vice-President
Sciences Applications International Corp.
San Diego, Calif.

Ongoing support is determined by the preferences of the customer. What we find works best in many cases — and is preferred by our customers — is for the customer to acquire enough knowledge and detail about the project so that it is self-sufficient when all of the contracted items are completed.

According to our customers, one of the most compelling reasons to learn the system is so they can be independent of the integrator. They can handle their requirements internally and manage their own change control.

GAD J. SELIG
Vice-President and General Manager
Nynex Complex Systems
Integration Group
White Plains, N.Y.

In a turnkey system or network, there is no additional support because the customer does not want to pay for it. If you think of it as a scale, on one side there is no additional support. You implement, you design, you install, you train, and then you walk away. On the other side, the customer wants the system integrator not only to design, implement and train but also to operate or facilities manage the system, data center, voice/data network, control center, etc. Support is a separate contract within the systems integration contract. It is a case-by-case situation; it can go from no support to 50% to 100%.

Generally, customers will write in maintenance support depending on the complexity of the system or the network. If it's a simple (single vendor) system or network, there may not be any maintenance, and the customer may assume responsibility for it. If it's more complicated than that and the customer does not necessarily have the technical bandwidth to perform the maintenance, for example, then the systems integration will do that on a monthly fixed-fee basis. In general, the longer the period, the less expensive it is for the customer.

MIKE LITTLE
Vice-President
Information Services
Boeing Computer Services
Bellevue, Wash.

After a system has been designed, installed and tested, there's a wide range of follow-on services that can be provided as part of the systems integration job. On one end of the spectrum, a systems integrator may provide a complete operations and maintenance function; at the other end, the customer may simply require documentation and training for in-house personnel. Between these two extremes are innumerable options.

But no matter where a customer falls on that spectrum, a primary task after a system has been installed is to ensure that new technology — when cost-effective — can be folded into the existing system. ●

F.Y.I.

London-based research firm **Ovum Ltd.** forecasts a rosy future for **electronic data interchange** (EDI) technology. Sales of EDI services and products expected to jump from $86 million in 1990 to $396 million in 1994.

In another Ovum study, 57% of U.S. and European firms were found to already have or are considering an OSI strategy.

Dun & Bradstreet Software and **Sterling Software** announced networking deal. Pact lets D&B customers electronically exchange purchase orders and other documents with trading partners via EDI. D&B will supply enhanced applications; Sterling will supply translation software and third-party network service.

U.S. Senate selected **Planning Research Corp.** to replace senate's local- and wide-area data communications networks. System integrator's 10-year contract valued at $65 million. PRC's principal subcontractor for WANs is **U.S. Sprint Communications Co.**

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The management information center

The new generation focuses on end-user development as well as on personal computer services

BY JIM KERR

“There's one thing stronger than all the armies in the world, and that is an idea whose time has come.”
Hugo, 1870 (c.)

The management information center (MIC) is the next evolutionary step up from the information center. And its time has come.

The mid-1980s information center focused primarily on managing the selection and acquisition of personal computers. Although many of the original information centers offered special training and PC software demonstrations, most do little, if any, end-user systems development. And it is end-user systems development that makes MICs different from their predecessors.

In the MIC, chores such as maintaining computing inventories and installing packages are augmented by such responsibilities as designing and integrating end-user systems. "Augment" is a key word here, because the MIC also assumes traditional roles — making it the new and improved information center of the '90s.

Some history

The information center concept was introduced by IBM Canada in 1982. IBM wanted to improve the level of service that information systems were providing to the user base. The belief was that a separate group supporting end-user computing would lessen the backlog and help achieve fuller automation. End users would in essence be providing for themselves through PC-based solutions.

It wasn't long before the success at IBM spread. Eighty percent of large firms in a recent American Management Association survey reported staffing an information center.

Many organizations take the information center concept seriously. United Technologies Corp. (UTC), for example, sponsors a cross-corporate user group that allows UTC information center personnel to compare notes and strategize future undertakings.

That a major corporation is funding an information transfer across member companies illustrates the importance many executives place on MICs. This kind of support will lead to the further growth and expansion of the MIC charter.

What MICs do

Simply put, MICs help end users define their systems requirements and then recommend and implement solutions. The MIC doesn't replace the IS department; it simply complements it.

Problems that can be solved by gaining access to an existing database — for example, generating a new report or installing workstation software — are directly addressed by the MIC. Problems broader in scope that require the creation of new programs and databases are referred to the conventional IS department staff.

A sample MIC organization (see chart on next page) has four major functions:

- **Training.** This function provides training in new tools and technologies. The MIC schedules regular classes in all the hardware and software that the center supports.
- **Acquisition and administration.** This sector investigates and purchases MIC technology. MIC analysts assigned to this area keep abreast of advances in technology, study trends and make evaluations. Besides arranging the acquisition of hardware and software, this sector also establishes and maintains the end-user computing inventory.
- **Design coordination.** This sector involves the integration and sharing of end-user systems. This area focuses on leveraging MIC solutions across the company. Design coordination analysts consult with the end-user support area to ensure that users take full advantage of the current suite of technologies, products and services available through the MIC.
- **End-user support.** This area assigns staff members to each business unit. "End-user support representatives," as depicted in the organization chart, have dotted-line reporting to both the MIC (which pays their salary) and the business areas (which set their priorities).

Julia Talcott

The IS role

Problems can arise if the MIC provides better end-user service than the IS department. This can be avoided, however, by placing the directors of both the MIC and IS under the same manager. Any competition that arises concerning responsibilities can be resolved by the executive in charge.

With the competition issue gone, the IS department and the MIC can form a partnership that is mutually supportive.

For example, the MIC can recommend IS involvement in certain business issues (such as a strategy for supporting tax-law changes) because a representative is located in the

---

Kerr is director of data architecture at The Equitable in New York and an adjunct professor of information systems at Rensselaer Polytechnic Institute in Troy, N.Y.

• A partner for IS

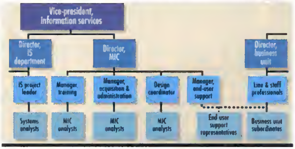
• Defines problems, builds solutions

• A structure for the '90s

business unit when the situation arises. Such opportunities are often missed in existing setups because of a lack of communication between IS and its users.

Two-headed IS

In the Management Information Center model, conflict is minimized because both the IS director and MIC director report to the same boss


Vice-president, information services
Director, IS department
Director, MIC
Director, business unit
IS project leader
Manager, training
Manager, acquisition & administration
Design coordinator
Manager, end-user support
Line & staff professionals
Systems analysts
MIC analysts
MIC analysts
MIC analysts
End user support representatives
Business unit subordinates

CW Chart: Paul Mock

The flip side of the partnership comes when establishing end-user access to existing databases and file extracts from IS production systems, for example. Without such "access rights," the MIC's ability to respond to most users' requests is impaired. It cannot provide systems development service without the full cooperation of the IS department.

IS needs the MIC, and the MIC needs IS. This relationship can be further enhanced by monthly systems coordination meetings conducted by the MIC. (It is up to MIC members to facilitate the meetings, because IS managers simply don't care in most instances.)

Coordination meetings are held each month and are sponsored by the MIC's design coordinator. The meeting facilitates the sharing of development ideas between the MIC and IS departments.

Each meeting lets MIC representatives share project progress with IS project leaders. It gives IS project leaders a chance to discuss major development activities, as well as their potential role in meeting reported end-user needs, with MIC personnel. This kind of free exchange is imperative to avoiding redundant activity between the two areas.

Furthermore, these monthly meetings help the design coordinator keep track of the end-user applications that each support representative is developing. Opportunities for integration and application reusability can be identified. Coordination strategies are discussed among meeting participants.

An MIC environment must be developed to meet end users' needs effectively. It is true that a majority of MIC applications are PC-based, but a strategy is needed to populate these workstations with information from mainframe systems. That strategy can present problems.

The 'right' architecture

A solution to those problems lies in the creation of a two-tiered processing architecture that separates the MIC environment from the transaction processing environment. PC, mainframe and relational tools are used to effect this.

The MIC environment is rooted in subject area databases. Each subject area (e.g., product, client, employee, etc.) is populated by summary information from the transaction processing systems. Relational technologies such as SQL and DB2 are employed to provide MIC users with ad hoc query capabilities to these databases.

Once this environment is established, other end-user tools, such as fourth-generation languages and PC packages, can be used to massage data extracted from the MIC subject area systems.

Data at the core of the workstation environment can be manipulated in a variety of ways. PC tools are used to create reports, and software packages are supplied as necessary. Office systems communicate data to other interested parties across the concern.

Mainframe capabilities are also provided through the workstation environment. Data import/export routines are made available for file transfers across the microcomputer and mainframe platforms. Access to relational query tools and host applications is also facilitated.

The success of the MIC's two-tiered processing environment depends on the data architecture that underpins it.

A comprehensive data management strategy is needed to reap the benefits of the MIC environment. The heart of the strategy includes a systematic way of identifying and maintaining the subject area databases needed to support the end-user decision-makers.

The best way to define these databases is by interviewing key MIC users across the company; this is clearly the role of the data administrator. However, the MIC should coordinate and participate in the process to gain an understanding of the databases as they are defined.

Automated joint application development techniques are a powerful means of gaining insight into the user's data requirements. In most cases, the basic subject areas — product, client and employee — can be identified in a matter of just a few weeks by a team of users and MIC support representatives.

Once the subject areas are identified, the data that is needed to populate each database must be determined, along with a plan for extracting and moving the data from IS production systems to the MIC databases.

Ford Motor Co., for example,

High tech for MICs

Even though the information systems and management information center (MIC) environments are logically separate, shared systems and databases may exist between the two.

For example, consider a multidivision corporation that performs transaction processing at sites across the country and has an MIC at corporate headquarters. Its data distribution scheme would call for a decentralized environment of local processors. Powerful data communication networks pass information to the databases at the home office, where MIC users around the country can have access to it.

Centralized processing is another popular scenario that allows all computing to be done at one location. If that location is running at capacity, then the introduction of MIC processing beckons the need for a new CPU. The additional throughput cannot be supported with the current iron.

Both types of environments can carry some hefty price tags, however, thanks to trunk-line expenses, network and CPU hardware, as well as PC communication boards, just to name a few. Therefore, alternative means of processing are needed.

Among the multitude of technologies available to MICs, compact-disc read-only memory (CD-ROM), database machines and client/server architecture are the most intriguing.

CD-ROM. In a CD-ROM environment, remote data from processing units around the company is fed to a centralized MIC processor. Data in the system is then extracted to tape, and the tape is mastered to CD-ROM. The CDs are then distributed back to MIC users at various company sites.

A variation is to have various MIC subject area databases exist in a centralized MIC environment. Each subject area is then extracted and converted to CD-ROM separately. The CDs are then distributed to users who require access.

Each approach has its advantage. The first simplifies the extract/mastering process and allows all users equal access to all MIC databases. The latter has a more complex extract/mastering scheme but helps to limit data access to those who need to know.

Database machines. This type of technology can become particularly useful in an MIC application. When CPU resources are already tight, the introduction of a high-volume MIC system can wreak havoc. Off-loading the data to a database machine is a nice way out. By doing this, the CPU can handle the bulk processing, while the database machine handles the ad hoc queries.

Database machines are also an excellent way to augment the host processing environment. High-volume databases, such as MIC systems, can be easily supported by these machines. They can accurately handle more than 100 transactions per second, which leaves relational database management system software far behind.

Multiple direct-access storage device (DASD) spindles with dedicated microprocessors compose the basic architecture of the database machine. The actual database is spread across the spindles. When a command enters the database machine, it passes a query to each microprocessor.

In turn, each processor searches through its spindle for information that matches the request parameters. If a match occurs, the data is sent back to the database machine's command center, where it is consolidated and sent back to the user.

In a typical database machine environment, the operational system workstations bang against the host processor, undisturbed by the MIC workstations, which are continually querying the database machines.

Client/server architecture. Client/server architectures will play a role in MICs as well. Most of today's client/server architecture implementations use the mainframe as a server and a workstation as the client. However, an MIC architecture can be created where operational systems residing on a mainframe feed less expensive servers the summary information they need to support their clients, who would have ordinarily accessed the mainframe for the information.

In essence, the client/server architecture moves the information processing out to the least expensive machines — freeing up the centralized CPU to do the number-crunching that it was meant for.

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has established an on-line information service that is composed of 24 separate databases for some 4,000 of its users. Vehicle specifications, technical designs and automotive industry news are just some of the subject areas maintained in the system. With a little discipline, other firms can establish a data architecture similar to Ford's. This will create an opportunity for MICs to concentrate on supporting the business better through the application of advanced technology.

Metamorphosis

MICs are in a state of transition. Traditional roles are giving way to new end-user computing responsibilities. No longer will information centers be just glorified PC management departments. True solutions to business problems will be created through MICs.

The dispersion of end-user computing specialists into the business units will provide a service base unequaled by today's centralized IS staff. New technology will introduce new opportunities for meeting users' needs more directly.

Adherence to simple guidelines will facilitate MIC transition; success will be determined by the quality of support. The future will bring a new era in departmentalized management computing as MICs take their position beside IS and executive and decision support departments. •

Adapted from "The IRM Imperative," published this month by R. J. Wiley and Sons. (Used by permission.)

Make the MIC work

Using a few of the following simple rules can help an MIC succeed:

1. Staff it with quality people. MIC personnel must understand the business areas they support along with the technology that's employed to meet users' requirements.

It takes a special mix of business knowledge, technical talent and communications skills to be effective in MIC roles. Define ways to hire and train individuals for these positions.

2. Distinguish MIC from IS department responsibilities. Jealousy and competition over end-user support will result as soon as the MIC concept is introduced unless a clear distinction is made between the two by the senior manager in charge. Mission statements will help, but management awareness and recognition of the competitive issues will ensure a smooth start for the center.

3. Distinguish MIC from end-user responsibilities. Both MIC personnel and users play a part in the success of the center. The responsibilities of the two must be clearly delineated.

Little reminders from managers on both sides of the house will avoid problems associated with users attempting to build systems and support analysts defining data needs in a vacuum.

4. Dedicate sufficient resources. MICs are only as good as the people and support they can provide to end users. Financial and personnel resources must be dedicated to grow and nurture the MIC concept into maturity.

5. Keep it simple. MIC personnel will be able to provide better service to end users if they are allowed to work from a simple set of standard tools. Support can deteriorate when the suite of technology changes from business area to business area. MIC resources must be dedicated to managing the tools and techniques supported by the center — otherwise, additional resources will be needed to manage the chaos introduced by dissimilar technology.

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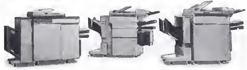

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NATIONAL
BRIEFS

More hands on DEC

Digital Equipment Corp. reached across the Atlantic last week to acquire the financial services business of London-based **Data Logic Ltd.** The deal reportedly gives DEC some 100 new employees as well as a corps of Unix-based financial information systems already at work in an estimated 30 banks across Europe.

■

Our object all sublime

Computer-aided software engineering (CASE) products maker **Atherton Technology, Inc.** and **The Software Productivity Consortium**, the Herndon, Va.-based intervendor cooperative effort to spur advances in CASE tools and methods, have joined forces to advance the march on object-oriented software engineering. The consortium will use Atherton's products to speed up the improvement of methods by which consortium members can capture and manage information generation during the creation of software. Sunnyvale, Calif.-based Atherton is no stranger to the alliance route: The firm is an IBM business partner and also has technology exchange agreements with DEC.

More briefs on page 132

Counting sales before they hatch

NET chief combats exaggerated sales figures and shortsightedness to revive firm

BY ELISABETH HORWITT
CW STAFF

Last November, Daniel Warmenhoven left a high-level job at Hewlett-Packard Co. to become chief operating officer and chief executive officer-apparent at what was then the golden goose of the T1 switch industry: Network Equipment Technologies Corp. (NET).

"When I came on board, NET seemed close to achieving its goal of $200 million [in revenue for fiscal 1990] and was hoping to go to $500 million in the next couple of years," Warmenhoven recalled.

Last spring and summer, however, it became apparent that the golden goose had laid several eggs. Because, in part, of some inadequate and inaccurate sales reporting, NET had to drastically revise its third- and fourth-quarter 1990 revenue figures downward in April, causing shareholders to file a suit alleging the release of misleading financial data.

The picture got worse in July, when NET reported a net loss of $13.3 million for the first quarter of fiscal 1991. At the same time, management went through an upheaval, with Bruce Smith resigning earlier than expected from his CEO position. Smith had concluded that "the situation, with a rebuilding problem, better fit my skills than his," Warmenhoven said.

Thus, Warmenhoven took up NET's reins early, but he faces a very different and much more difficult set of challenges than he had originally expected, he acknowledged. "We have to get down to fundamentals, rebuild the underlying business, generate new accounts and get the revenue stream up to where it was."

At the root of NET's troubles was the company's slowness to adjust to its own and the T1 switch industry's maturity, Warmenhoven said. Pressured to keep up 50% yearly revenue increases in a shifting market, he said, salespeople reacted by reporting sales that had not yet been consummated. This practice resulted in the misleading financial report that triggered the shareholders' suit.

Perhaps more damaging to NET's long-term prospects, salespeople concentrated on existing customers in order to make quick profits and neglected the job of generating new accounts, which typically have a nine- to 18-month sales cycle, Warmenhoven said. As a result, the first quarter of fiscal 1991 "was dry — we'd supplied our old customers with everything they needed, and little new [customer account activity] came on board," he added.

Indeed, NET closed only 10 new accounts during that quarter, in contrast with its former rate of 20 to 25 new accounts per quarter. Getting momentum back has been a major priority for Warmenhoven, who said he hopes to see 20 new accounts this quarter.

Warmenhoven's recovery strategy

Continued on page 131

From here to obscurity?

Fall 1989: NET comes within a hair of overtaking Timeplex, Inc. in terms of worldwide market share.
November 1989: Daniel Warmenhoven leaves HP to join NET as chief operating officer.
April 1990: NET revises its third- and fourth-quarter 1990 revenue statements downward. Net income for the year was $13.5 million, down from $16 million in 1989.
April 1990: Roger Hobbs, senior vice-president of sales and marketing, resigns. Warmenhoven brings in new heads of product marketing, corporate communications and corporate architecture.
July 1990: Bruce Smith resigns as CEO; Warmenhoven takes over.
July 1990: Barrett Roach, NET chief financial officer and secretary, resigns, reportedly in order to give Warmenhoven a free rein in selecting his management team.
April to September 1990: Gradual reorganization in which:
- NET decreases staff by approximately 200.
- Four U.S. regions are collapsed into three, and U.S. and international sales and service are put under one vice-president.
- Ten quota-bearing sales representatives are let go.
- No more cutbacks are expected, Warmenhoven said.

October 1990: NET announces $7 million second-quarter loss but generates 25 new accounts.

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London financial bridge falling down

Financial center could lose status if $39 billion is not spent on IS in the next five years

ANALYSIS

BY JASON THOMAS
IDG NEWS SERVICE

LONDON — Even as the woes of Wall Street appear to be piling up virtually on a daily basis, recent reports indicate bad news hurtling straight at the UK's financial stronghold if some changes are not made — and soon.

London faces losing its place as one of the financial centers of the world if $39 billion is not spent on information technology infrastructure support during the next five years, according to a report from UK-based market research firm Butler Cox.

"In the end, lack of [information technology] infrastructure support threatens London's competitiveness," said Patrick Murphy, head of Butler Cox's banking division and co-author of the company's 12-month study on the problem.

Murphy suggested that cities such as Frankfurt — which has invested heavily in new buildings with higher specifications, the newest technology and better information technology infrastructure — could take over as Europe's financial center. "We may find international companies, especially the [information technology-intensive] ones, going to places like Frankfurt instead of London," he said. "The role of [information technology] has changed. It is no longer adopted because it gives you a competitive edge — you need it to survive."

But Murphy said it was not just a case of losing new business. "Unless companies invest in their buildings' infrastructure now, the cost of doing so later may well put them out of business," he said.

The report, which was sponsored by IBM, Digital Equipment Corp., AT&T and British Telecommunications, surveyed 52 new, old and redeveloped buildings and compared them with a set of guidelines drawn up in consultation with the Royal Institute of British Architects.

The guidelines included issues such as raised floors, whether information technology infrastructure support was planned from the start of a project and whether designers and developers were told about information technology needs.

Only 11 of the 52 surveyed sites met the standards. These results and the cost of bringing each one up to standard were extrapolated for the rest of London to arrive at the $39 billion figure.

About $7.9 billion is spent on new buildings every year in the UK. Murphy said most of these buildings end up being attractive but are an "occupiers' nightmare."

He cited the Lloyds building as a classic example of this dichotomy. "Developers did not look at the long-term [information technology] needs when it was built," he said. Almost as soon as it was occupied, it was beyond capacity in terms of cabling.

According to Murphy, information technology needs have to be considered right from the beginning of a project. He said that the Canary Wharf project proved to be a good example.

> "UNLESS COMPANIES invest in their buildings' infrastructure now, the cost of doing so later may well put them out of business."
>
> PATRICK MURPHY
> BUTLER COX

That project was one of the 11 to pass Butler Cox's test, and Malcolm Humpries, who is responsible for communications and information technology on the project, said that the buildings had been designed to cope with all information technology needs for the projected 70-year life of the development.

Thomas is on the staff of PC Business World, *an IDG Communications British Publication.*

French computer forum attracts few products

BY CLARISSE BURGER
and FREDERIC BERGE
IDG NEWS SERVICE

PARIS — Despite the presence of computer and telecommunications heavyweights, France's first computer and telecommunications forum, Forum de l'Informatique et des Telecommunications, or FIT '90, which was held near Paris last month, boasted very few product announcements.

Moreover, according to industry speculation, next year's forum, which is scheduled for Oct. 1-4, 1991, may be even worse, as competition is expected to come from worldwide telecommunications trade fair Telecom '91.

About 80 computer, telecommunications and network exhibitors, including NV Alcatel, British Telecommunications, Groupe Bull, Digital Equipment Corp., Epson America, Inc., France Telecom, Hewlett-Packard Co., IBM, NCR Corp., Netherlands-based Philips N.V. and Wang Germany, attended FIT '90.

Inaugurating the exhibition, Paul Quiles, French minister of Post, Telecommunications and Space, seized the opportunity to speak out on telecommunications reform and regulation.

Despite the roster of heavyweights in attendance, however, the list of actual products displayed remained relatively thin.

The few announcements and presentations of recently launched products came from France Telecom, which displayed an IBM Personal System/2 equipped with an IBM Integrated Services Digital Network (ISDN) card for consultation and transmission of multimedia files, connected to Numeris, France's ISDN network. This application is based on software designed by France's Joker Telerec and developed by France's SGIP.

British Telecom also demonstrated its new value-added Global Network Services offering, which targets private multinational networks. NCR Corp. presented its software package Cooperation, which was designed for cooperative processing on its new NCR 3000 systems. Prime introduced standardized X.400 messaging systems and announced along with Novell, Inc. the availability of server software Netware Portable for Intel Corp. 80386-based EXL machines.

Burger and Berge are on staff at Le Monde Informatique, *an IDG Communications French publication.*

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INTERNATIONAL

BRIEFS

How do you say 'double-digit increase' in Japanese?

Ask anyone at **NEC Corp. or Fujitsu Ltd**. Japan's computer and telecommunications market leaders both saw mounting sales fuel double-digit profit growth in the first half of 1990. Net income at NEC rose 18.5% on six-month revenue up 9.8% to $11 billion. Fujitsu, meanwhile — despite reportedly soft semiconductor sales — reported a 10.8% jump in revenue and profits alike.

■

Baker's dozen at Apple

Apple Computer, Inc.'s 13th European subsidiary, **Apple Computer Oy**, will be open for business in Helsinki on April 3, 1991. Built on Apple's acquisition of Finnish Apple products importer and marketer **Oy Mercantile Ab** late last month, the new firm will focus on providing sales strength and marketing support to local Apple resellers.

■

Recycling, IBM-style

IBM Japan Ltd. and Tokyo-based **Seibu Department Stores Ltd.** last week set up a joint-venture company to sell computer supplies. Called **MSI**, the new store will start selling recycled printer paper, printer ribbons, floppy disks, magnetic tape and other supplies on Dec. 1, according to both companies. MSI is initially capitalized at approximately $538,000 and will be owned 51% by Seibu and 49% by IBM Japan, a subsidiary of IBM.

■

Parlez vous AD/Cycle?

Cap Sesa, a unit of French software and services giant **Cap Gemini Sogeti**, teamed up with the French subsidiary of **IBM** to launch **AD/Consultants SA**, a Paris-based firm created to provide software engineering and consulting services to companies seeking to upgrade computer operations based on IBM's AD/Cycle system, according to both parent firms.

■

Did someone mention David?

When UK-based **HM Systems** took on France's **Groupe Bull**, the UK's ICL Ltd. and U.S.-based **Compaq Computer Corp.** and **Dell Computer Corp.** to secure a $2 million contract from Heathrow Airports Ltd., some observers no doubt noted that the relatively small computer systems vendor was not in the same league as the international giants. They were right. HM emerged in a class by itself: the winner.

Counting

CONTINUED FROM PAGE 129

calls for implementing the "support that is commensurate with a company of NET's size, but not the overhead and bureaucracy" that typically proliferates as a company grows, he said. "We want controlled chaos, not Brownian movement."

Cost control is high on Warmenhoven's agenda. While NET revenue was falling, "expenses were still going right to the moon," he said. The number of people on NET's payroll went down by 200 this past summer through a combination of attrition, functions consolidation and job elimination, an NET spokeswoman said. Of the 200, 80 were layoffs, including those of some low-performing sales personnel, she added.

On the service side, Warmenhoven said, NET is installing a system to track the service calls a particular type of NET switch has generated, for planning and quality control purposes. Also in the works is a "more sophisticated materials management system," he added.

NET's biggest bulwark against adversity, industry experts agreed, is a loyal customer base coupled with an outstanding reputation for quality products, service and support.

"Every time another piece of bad press hits, we go through another round of questioning in our companies: 'What's happening at NET?' " said Tom Calabrese, president of Progressive Users Stimulating and Helping NET, or Pushnet, and assistant director at The Travelers Corp. "But as time goes on," he added, "we're more and more convinced that there is no negative impact" on product quality or support.

"I have no concern at all about Sears' continued commitment to NET as our vendor for both T1 and T3 multiplexing," said Gary Weis, senior vice-president at Sears Technology Services, Inc. "Service has remained up to the usual standard, and their products are keeping pace with our requirements."

Even with a loyal customer base, however, NET faces a long road to full recovery. The company recently reported a $7 million loss for the second quarter ending Sept. 30, compared with a net income of $4.8 million for the comparable period a year ago. On the plus side, second-quarter revenue was up 43%, compared with the first quarter of fiscal 1991, NET said.

Stalled sales

Current financial shakiness is likely to slow sales over the short term among both new and current users, according to Michel Guite, a vice-president at Salomon Brothers, Inc. Guite conducted his own survey of 85 NET users at the Pushnet meeting last June and found that "85% agreed that NET's recent bad news was affecting their purchasing strategy, causing them to either defer purchases or look at other vendors."

And yet, "because so many users spoke well of the company, I still recommended NET's stock," Guite said.

Last week, NET demonstrated that its new product strategy is alive and kicking by announcing its next generation of high-end switches, which were developed by its 1-year-old company, Adaptive [CW, Oct. 29] (also, see story page 132). Sears last week announced that it had signed up to buy three of Adaptive's newly announced Sonet Transmission Managers with the intent of using the switches to connect its three data centers.

Also encouraging is the fact that NET signed up 25 new accounts during the last quarter — about the same number that was standard before the troubles set in. "I think that's a good sign that NET is recovering," Guite said.

Best bet

While NET founder Bruce Smith may not have been aware of the heavy financial weather looming on his company's horizon last fall, he apparently picked the right future chief executive officer to pilot his company out of the mess, according to former and current colleagues.

"Daniel Warmenhoven is one of the strongest managers and leaders I've ever met in the business," said Ed Muns, HP's general manager of systems, who knew Warmenhoven throughout the latter's five-year tenure at HP. "If I had to invest somewhere, I'd put my money in NET: It's the best bet in the industry with Warmenhoven and his team in place."

Warmenhoven said he was hired for two important attributes. One was his "broad experience in data communications — most NET people have a telecom background." A second was his "experience running a large organization," garnered while heading HP's 2,500-person information networks group. NET has approximately 1,130 employees.

NET's Warmenhoven: *Old hands like what they see*

Muns described Warmenhoven as "a person of balanced extremes."

For example, he said, Warmenhoven "listens extremely well in a one-on-one situation, but his style can be very contentious during an internal group meeting."

In fact, Warmenhoven initially kicked up some dust at HP's characteristically laid-back managerial meetings, Muns indicated.

Warmenhoven's style might, indeed, be too strong on a managerial level if he were not prone to "surrounding himself with and depending on strong people," Muns said. The new head of NET has already assembled a strong managerial team at the firm, including three people he hired last April:

- Vice-President of Corporate Marketing Karyn Mashima, former manager of HP's Openview network management program.
- Director of Product Marketing David Owen, formerly of rival T1 switch vendor Stratacom, Inc.
- Vice-president of Corporate Architecture Robert Bressler, formerly a vice-president at 3Com Corp.

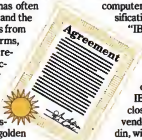
So far, old hands at NET like what they see. "There is no question that Dan is doing a good job," said Audrey MacLean, CEO of NET company Adaptive. "He has strong product financial and management skills and an eye for tracking details to ensure things are on course. He's just what the doctor ordered."

ELISABETH HORWITT

CDLA passes ceremonial baton

BY NELL MARGOLIS
CW STAFF

RENO, Nev. — They are changing guard at the Computer Dealers and Lessors Association (CDLA) — and this time, said CDLA President Kenneth Bouldin, the biennial board shifts go well beyond the ceremonial. Moves such as the election of the first female to a board that has often been labeled an old boys' club and the infusion of younger executives from entrepreneurial leasing firms, Bouldin said, signify CDLA's recognition that the leasing sector's charge into the next few years of brutal competition amid probable recession will have to be led by a new guard whose vision is undistorted by memories of the golden age of computer leasing.



"This was a purposeful, planned attempt to energize the association," Bouldin said. "We've got to refresh this thing."

CDLA's annual meeting last month bore signs of just how earnestly the organization is trying to do that. A seminar on software leasing — a possibly promising concept still in its infancy [CW, Sept. 30] — was scheduled at two different times to accommodate a strong interest. Keening over the devouring of the third-party leasing companies' market by the ever-mightier IBM Credit Corp. — a major feature at many recent CDLA conferences — was virtually absent from this one. Representatives from Amdahl Corp. and Hitachi Data Systems, Inc. gave presentations. Amdahl and HDS rank high on the list of vendors whose wares are appearing with increasing frequency in the portfolios of computer lessors who see diversification as key to growth.

"IBM used to be the star of this show," Bouldin noted. "They're not anymore."

Forging a more open relationship with IBM even as it weaves closer ties with alternative vendors, according to Bouldin, will be one of the principal challenges facing CDLA during the next several years.

New on board are Dean Painter of CLG, Inc.; Hildegarde Beyor of HGB Marketing, Inc.; Richard Nelson of Nelco Ltd.; Robert Neumeyer of Neu-Comp Co.; and Melvin Kleinman of El Camino Resources, Inc. Beyor's appointment for a one-year term gives CDLA its first female director. Heading up the board is newly elected Chairman Joseph B. Kelly Jr. of Davenport Financial Corp.

"What we see here is quietly revolutionary for CDLA," said Charles Greco, president of Framingham, Mass.-based Technology Investment Strategies Corp. "Guys like Rick Forsythe, who have had tremendous — and beneficial — influence, are voluntarily taking on a kind of senior statesman status."

Forsythe, head of Forsythe/McArthur Associates, Inc., received CDLA's 1990 Spirit of Excellence award for exemplary representation of the computer leasing industry to the greater business community.

In effect, Greco said, "They're passing on the scepter to leaders from some of the younger, smaller companies — the ones that are going to make it or break it in the battles that are out there now."

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COMMENTARY

Andrew Mohr

Dinosaur mega-procurements

The federal government's microcomputer landscape is inhabited by dinosaurs. They live in the form of extremely large, unwieldy microcomputer acquisitions called "mega-procurements." Like all relics, mega-procurements belong in museums, not on the street.

The government buys billions of dollars' worth of microcomputer products every year. Historically, each individual agency, bureau, activity or office that required micros would buy the specific products it needed.

Over the last several years, however, the government began combining an entire agency's needs into a single mega-procurement.

The result has been procurements comprising literally hundreds of hardware, software and peripheral products. The value of just one of these behemoths can total several hundred million dollars or more.

So, what's wrong with a several-hundred-million-dollar contract? Just this: While bigger might be better in many cases — memory comes to mind — the rule doesn't hold for mega-procurements.

These contracts are so cumbersome that it often takes two years or more from issuance of the solicitation to award. By the time the contract is awarded, the equipment proposed is almost always obsolete.

Considering that mega-procurements are usually designed to last for five years, users are badly served when forced to buy 2-year-old equipment at the the beginning of a contract and 7-year-old products five years later.

Also, fewer and fewer micro vendors can afford the expense of bidding on and losing mega-procurements. Because of the cost involved with bidding, vendors are more inclined to protest a mega-procurement award to a competitor. Such protests further delay the procurement.

The contract's size makes it hard for the agency to conduct the procurement properly and evaluate offers correctly. Consequently, the protester frequently wins, often requiring the agency to start the process all over again. In the meantime, the agency's users are left in the lurch.

Mega-procurements arose for two main reasons. First, agencies believed that they would get better, lower prices for large volume purchases of microcomputer products. Second, agencies thought that they could use the huge contracts to help standardize their equipment — a result that would, they thought, lead to efficiency gains.

Perhaps these reasons were valid several years ago. However, both the micro market and the underlying technology have long since changed. Today, the grief caused by mega-procurements exceeds by far any presumed benefit.

First of all, agencies don't need mega-procurements to garner low prices. The federal microcomputer arena has become a cutthroat commodities market. Even for relatively small purchases, the government can buy what it needs for a few points above dealer cost.

Also, there is no guarantee that the low prices obtained will last the life of the contract. Most mega-procurements contain a technology upgrade clause that lets the contractor substitute new products over the contract's life.

This means that the contractor can replace the low-priced junk that won it the contract with higher-priced products at better margins. While users get new equipment, the agency loses any cost savings it might once have had.

Second, agencies no longer need to force compatibility requirements on users. Compatibility may once have been critical, but it is less compelling in an age of coprocessors and local-area networks. Coprocessors enable IBMs to work like Apples, and vice versa. And since the advent and improvement of LANs, different computers can converse, even if they can't swap software.

The government would be better served by breaking mega-procurements into smaller, more manageable acquisitions. These sleeker procurements could be conducted more quickly and would be better positioned to survive protests. They would once again allow a wide variety of vendors to compete for government business, thus increasing competition and improving service.

Users would benefit the most by getting newer equipment faster. And Computersaurus Rex could go back to the museum where it belongs.

Mohr is a partner at the law firm of Cohen & White in Washington, D.C., specializing in the federal procurement of IS goods and services.

Adaptive's unique environs spark development

BY ELISABETH HORWITT
CW STAFF

For a positive sign of NET's continuing product growth, one has only to enter the building that houses Adaptive.

Created to preserve an entrepreneurial atmosphere even as the rest of NET became increasingly mature and corporate-minded, Adaptive houses a group of maverick engineering types whose job is to create the next generation of high-end NET switches.

In contrast to NET's shiny, corporate complex, the Adaptive building's interior is casual, even scruffy. A meeting room near the front door is simply furnished with an upright piano and a white board. The cafeteria, by mutual agreement, has plenty of healthy munchables and no junk-food machines. A room full of toys has been set aside for kids whose parents "inevitably come in during weekends, and who quickly exhausted the possibilities of the white board," said Adaptive Chief Executive Officer Audrey MacLean.

Adaptive was purposefully created "as an incubator start-up, to blend structure with entrepreneurial spirit," said NET CEO Daniel Warmenhoven. Its employees receive lower salaries than prevail at NET proper, but they can expect to own up to 20% of their own company, if they meet management's expectations.

Adaptive's founders hoped that the company's rarefied atmosphere would help spark development of NET's strategically crucial next-generation high-end switches. Last week, Adaptive brought out its first product, a 45M bit/sec. switching platform.

The first of a planned series of high-end offerings, Adaptive's Synchronous Optical Network Transmission Manager, targets two markets considered critical for NET: private network users with rapidly growing bandwidth demands and carriers that want to better meet customer demand for more flexible, cost-effective high-speed network services.

As a start-up within a corporation, Adaptive has also been useful as "an outlet for people we were at risk of losing," Warmenhoven said.

In particular, Adaptive offers an alternative to employees who miss the old feisty, risk-taking atmosphere at NET. MacLean, an NET founder, is one such employee. "My going to Adaptive was not driven by a disdain for big companies or a liking of small ones, but by a desire to change the world," MacLean said.

Adaptive's status as a separate firm, whose funding is buffered from the parent company's ups and downs, has been reassuring to employees during NET's recent financial crises. "There has been no negative implications for Adaptive; we are growing at full speed," MacLean said.

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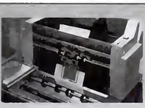

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NATIONAL

BRIEFS

Phoenix rising

Cleveland-based computer maintenance player **Phoenix Technologies, Inc.** expanded its reach across the repair and refurbishing market last week with its bid to acquire **TRW, Inc.**'s Customer Service Division. Terms of the deal, expected to close late this month pending regulatory approval, were not disclosed. According to Phoenix, however, the TRW division will maintain both its management staff and its approximately 1,250 employees when the industry's third-largest microcomputer-based maintenance provider takes over as its new parent.

◆

Electronic postman rings

Also on its way to Europe is electronic mail applications vendor **Soft-Switch, Inc.** The Wayne, Pa.-based company plans to use new development facilities and direct sales and support offices in the UK as a springboard for expansion in the coming market. The firm also announced the acquisition of facsimile and telex provider **Systems & Telecoms Ltd.** and a joint development agreement with **Data General Corp.** aimed at bringing the Soft-Switch Central mail backbone to DG's reduced instruction set computing-based Aviion line.

◆

Venturing abroad

Two venture capital firms are buying a ticket to Europe for Mountain View, Calif.-based document retrieval software vendor **Verity, Inc.** According to Verity, $3 million in new venture funding from Thomson-CSF Ventures in Paris and New York-based Chancellor Capital Management will be used to get Netherlands-based **Verity Europe** up and running, as well as to finance a wholly owned subsidiary, **Verity Benelux**, also based in The Netherlands. The kitty also boosts total venture investment in the 2-year-old software firm to approximately $12 million.

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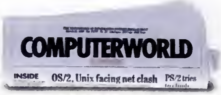

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Richard Weiss

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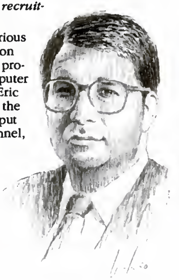

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COMPUTER CAREERS

Biotech: Great expectations, few jobs

BY ALAN RADDING
SPECIAL TO CW

The biotechnology industry may offer exciting opportunities during the coming decade for computer professionals who focus on small, networked systems and enjoy an entrepreneurial environment. But don't pack your bags yet.

The industry has been identified as one of the nation's most potentially lucrative, with expectations that sales will reach $100 billion during the next 10 years.

Product sales revenue for the entire biotech industry hit $4 billion this year — a modest level compared with other technology-based industries — but the rate of growth is accelerating as more products finally reach the market. Revenue from products is increasing at the rate of 25% per year, says Steve Buckley, the East Coast regional director of the high-technology group at Ernst and Young.

Employment in the field is also growing. With a 7.7% increase over the past year, biotech now leads all other technology sectors, according to a survey by market research firm Corptech in Woburn, Mass. However, demand for computer professionals is still modest.

Information systems recruiters say that overall, the biotech industry has been a disappointment in terms of employment. "It's not as dynamic as people thought it would be," says Lee Silver, president of L. A. Silver, a recruitment firm based in Framingham, Mass.

Silver says he placed computer people in the industry a few years ago but none recently. He attributes the slowness to the fact that firms are still focusing on basic research rather than management, production or customer service — factors that drive the need for systems.

The situation on the West Coast, a hotbed of biotech activity, isn't any different. Source EDP in San Francisco finds very little interest in systems people at the area's biotech firms. "The very largest companies might have a [Digital Equipment Corp.] VAX and maybe 15 to 20 computer professionals," says Dave Flansbaum, Source EDP's Northern California managing director.

One of the problems is the size of biotech firms. Even the largest ones are quite small. More than half of the firms in the field have fewer than 50 employees. "The top-tier firms have 300 employees, but only 5% of the companies in the industry are that size," Buckley reports.

From a systems standpoint, "you'll probably find that these companies use a lot of PCs and workstations and networks," says William A. Grady, a partner at Romac Associates.

Biotech profile

San Francisco-based Genentech, one of the largest biotech companies, is typical of the big companies in the field. The company has about 55 people in systems, divided into two major groups: operations and support. Each group is split along two lines: research and business.

From a systems standpoint, the research side is Unix-based, while the business side is a VAX/VMS operation, reports Jack Murpby, a spokesman at Genentech. There is also a network services group that concentrates on Apple Computer, Inc. Macintosh-to-VAX connectivity, he says.

David Thompson, a computer analyst at Genentech, works in the microcomputer support group, spending most of his time helping users with off-the-shelf applications for their personal computers and Macintoshes. Thompson, a liberal arts college graduate, learned micro support functions at Pacific Bell, an engineering-oriented company.

Although much of the work he does is essentially corporate in nature — no different from that of a micro support person at a bank or an insurance company — Thompson was attracted to biotech by the excitement surrounding the industry. "The systems people don't make the discoveries, but it is still a very exciting place to work," he says.

> INFORMATION SYSTEMS recruiters say that overall, the biotech industry has been a disappointment in terms of employment.

While it is not necessary to have a biology or chemistry background, Thompson says he found his prior experience in an engineering organization helpful. Biotech companies look for people who will fit in a fast-paced, entrepreneurial, scientific/engineering environment.

Brian Faldasz, senior data processing engineer at Genmap in New Haven, Conn., had no biotech background when he joined in the founding of Genmap, a tiny company of nine employees that is still in the research stages. Faldasz had an engineering background and put himself through a crash course in biotech. "A lot of the stuff you work on isn't biology-specific," he says.

Faldasz, for instance, spends most of his time working on Genmap's custom database using a Sun Microsystems, Inc. workstation. He also helps other people when they are having problems with their Macintoshes or PCs.

Spreading out

The biotech industry is concentrated in Massachusetts and California, Buckley says, but activity is spreading to the Washington, D.C., Baltimore, New York, New Jersey and Pennsylvania areas.

Typically, jobs are filled by word of mouth and personal networking. The pay scale in biotech is competitive with other industries. For the most part, however, companies don't look beyond the local market to fill a computer job, Grady says: "They want to save money by not having to pay relocation expenses."

While a computer career in the biotech field may be appealing, the future is not likely to be a smooth and steady ride. The industry expects a lot of mergers and consolidations over the next 10 years, Buckley says. "Biotech mergers are an accepted fact of life," he says, because it takes an enormous amount of money — $200 million over 10 years — just to bring a biotech product to market. That is far beyond the resources of a small start-up company.

But as the companies get larger, through internal growth or acquisition, they will require more and bigger information systems, and they will need to hire more IS professionals.

Radding is a free-lance writer based in Newton, Mass.

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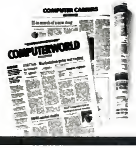

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EOE M/F/H/V

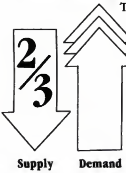
A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so has the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely *is* competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better -and that's sure to make your recruiting tougher in the '90s.

Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who would *consider* new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

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Computerworld needs just 3 working days for your ad to appear

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Computerworld costs no more than local papers

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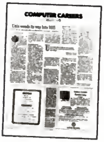

Just look at this week's Computer Careers section. You'll find a career editorial topic that will stir the interest of virtually any computer job seeker — passive *or* active. It's just one of countless reasons *Computerworld* is America's newspaper of choice on computing. No matter how much the times change.

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Requires 7-10 years' experience in teleprocessing systems programming supporting a large VTAM/SNA network comprised of CRTs, workstations and Local Area Networks. Extensive knowledge in installation, debugging, maintenance of VTAM V3.2, NCP VS, NETVIEW and related products as well as network troubleshooting and design required. Must have good communication skills to support computer operators and end-users, and interact with a variety of vendors for information and problem resolution.

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Project System Software Engineer. By 12/5/90 please send resume to: Employment Security Department, ES Division, Att: Job # 233526, Olympia, Washington 98504. Job Description: Designs, implements and tests complex and high level systems and software for mini computers. Assumes project responsibility over other engineers to design overall architecture of object-oriented graphical user interface and system components software for OS/2 operating system utilizing OS/2 and Windows operating systems, "C", "C++" and Smalltalk languages, and 32-bit computer. Designs distributed and concurrent applications in object-oriented environment. Assumes major project responsibility including: 1) requirements and analysis of project specifications; 2) product design; and 3) implementation of schedules. Requirements: M.A. or M.S. in Electrical Engineering, Mathematics, Computer Science or Physics. Two years work experience in software design project responsibility and in object-oriented design of graphical user interface and systems components including design of distributed and concurrent applications in object-oriented environment. This must include six months work experience utilizing windowing systems and multitasking operating system, "C", "C++" and Smalltalk languages and 32-bit computer. Must have proof of legal authority to work in the United States. Job location: Redmond, Washington. Salary: $64,000-68,000 per annum, depending on experience. 40 hours per week, flex time. EOE

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System Software Engineer, International Products Group. By 12/5/1990 please send resume to: Employment Security Department, ES Division, Att: Job # 2275394, Olympia, Washington 98504. Job Description: Designs, implements and tests complex and high level systems and software for micro computers. Works with other engineers to design applications software for foreign market utilizing MS-DOS and OS/2 operating systems, "C" and 86 Assembler Series languages. Works with Original Equipment Manufacturers to test and debug products prior to release. Responsible for evaluation of test results and decision as to whether product is ready to ship. Assumes major project responsibility including: 1) requirements and analysis of project specification; 2) product design; and 3) implementation schedule. Requirements: B.A. or B.S. in Electrical Engineering, Mathematics, Computer Science, or Physics. Six months' work experience in computer design or programming designing and adapting software for international sale and testing/debugging high-level and low-level systems software utilizing MS-DOS and multitasking operating systems, "C" and 86 Assembler Series languages. Must fluently read, write and speak Swedish, including current colloquialisms, idioms, and jargon, especially as pertains to business usage. Must fluently read, write and speak English. Must have proof of legal authority to work in the United States. Job location: Redmond, Washington. Salary: $35,500-37,000 per annum, depending on experience. 40 hours per week, flex time. EOE

SENIOR ANALYST PROGRAMMER required. Provides systems analysis, design, implementation and support for communication processes between lap-top and hand held PC's and company mainframes in connection with duty free sales. Design and development work will use structured system analysis techniques including Yourdan and De Macro. Microfocus Cobol and Turbo C as well as Communications packages and scripting languages including Procom+ and Automator. Will also use various development tools including Brief, Turbo C debugger and Microfocus workbench. Basis programming in C, IMS, PL1, and DB2. Applicants required to have a Bachelors degree or its equivalent in Computers, Math or Engineering and at least two years IMS PL/1 and IMS DB2 Applications programming experience. Experience must include at least one year of Yourdan structured design programming and one year of Microfocus COBOL programming. Experience must also include at least one year of analysis of in-flight catering services. Annual salary will be $42,800 for a 40-hour work week. Additional salary up to $46,000.00 per year may be paid if education and experience warrant. Interested applicants apply at the Texas Employment Commission, Ft. Worth, Texas, or send resume to the Texas Employment Commission, Austin, TX 78778-0001. J.O. number 5757320. This advertisement was paid by an Equal Opportunity Employment Employer.

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"We're in a highly competitive business," says John F. Bonney, Director, Education Services at Hitachi Data Systems. "In addition to the major players in the IBM-compatible mainframe training world," he adds, "there are dozens of smaller vendors with good name recognition. In order to be a standout in this industry, great service and excellent reputation are simply not enough. We need to keep our name, our product offerings and our class schedule in front of our current and potential customers constantly."

The education services division of Hitachi owes much of its success to direct mail advertising. When customers enroll in mainframe operating systems courses, chances are that they first heard about the courses through the mail.

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MARKETPLACE

For minimal scanning needs, consider handheld scanners

BY JESSICA KEYES
SPECIAL TO CW

The graphic arts field has long used desktop scanners to transfer images from paper to personal computers. Similarly, and largely because of the urgency of meeting deadlines, the publishing industry often uses scanners to move hard copy to screen as quickly and easily as possible.

Unfortunately, the scanners used in these cases are usually high end and typically require an investment in the $1,000 to $5,000 range. If your budget is limited and you don't have a high volume of copy to handle, you may want to consider buying a handheld scanner.

Handheld scanners are most suitable for those individuals and businesses that have only an occasional need to scan an image or printed page into their computers. Prices for these devices average about $600 (complete with bundled software), but careful shopping can uncover ones for as low as $200 (for hardware only).

However, there's quite a range in the quality of the many handheld scanners in the marketplace today. To save you from some major disappointments, here's a list of several points to check prior to making a purchase:

- **Determine what your scanning needs are.** Handheld scanners are not precise, incapable of handling a large volume and not as accurate as the more expensive stationary models. Therefore, if you're projecting heavy scanning traffic, stay away from handheld versions altogether. You'd be best advised to plunk down the cost of a desktop model.
- **Understand that handheld scanners are slightly difficult to maneuver.** Handheld scanners, which are about twice as wide as a mouse and about twice as long, require manual dexterity. All scanners — high end and handheld — come equipped with a window that displays the image or text you are scanning.

The problem with handheld scanners is that once you have the beginning of the image lined up, you have to manually drag the scanner down or across the page. Meanwhile, you have to press the scan button and eyeball the computer screen to see if you're on target. (It's not uncommon to have to rescan two or three times before you're satisfied.)

- **Make sure that the resolution of the scanner can be changed.** This is important. Dots per inch is a handy way of controlling the quality of graphics scanning. For an extremely detailed image, such as a photograph, you'll want the dots-per-inch resolution to be quite high. In addition, the lower the point size of the text you're scanning, the higher the dots per inch must be. Most scanners permit you to modify this setting in increments of 100 dot/in. to a maximum of 400 dot/in. Some scanners let you modify the dot/in. setting to 800.
- **Check to see if the scanner you choose can scan from top to bottom and from side to side.** This may seem trivial, but it's a worthwhile feature to have.
- **Ascertain which file formats images can be stored in.** The general reason for scanning an image (i.e., a picture) is to export it into another software package. Typically, this will be a desktop publishing or paint package. In order to export the image, you must first determine what type of file the software will save. Although there is a wide variety of file types, the two most common are PCX and TIFF, which stands for Tag Image File Format.
- **Ask the vendor if optical character recognition (OCR) software comes bundled with the scanner.** OCR software interprets the scanned image and converts it into meaningful text. If it doesn't come with the package, you'll need to purchase it. OCR software can make a big difference in scanning accuracy. Before making a purchasing decision, you may want to go to a PC dealer and try out the software for yourself. There are several OCR software packages on the market, with an average cost of about $500.

- **Check that the OCR software permits you to train new fonts.** The software will typically be preconfigured with one or more type styles. Problems may arise when you try to scan something with a different typeface or type size. In order for this to work, you need to have the flexibility to scan in the alphabet styled in the typeface and point size of choice. For those who don't possess the patience of training each letter prior to your scan, a training feature lets you scan the "live" document and have the software prompt you to answer questions about the letters it can't read.
- **Determine whether the scanner you are considering has a "text merge" function.** Obviously, handheld scanners can't scan a whole page of text in one try. It may take two or three scans before a whole page is stored on the computer. These scans will be stored in separate files that will then need to be merged.

If you don't have a lot of images to scan, handheld scanning is a bargain. Once you master the intricacies of OCR software and the skill of using a clumsy device for detailed work, you'll find the scanner to be an indispensable device.

Keyes is president of New Art, Inc., a management and computer consulting firm in New York.

Top-selling handheld scanners

- *Logitech's Scanman Plus*
- *The Complete PC's Complete Handscanner 400*
- *Marstek's The Mars 105*
- *DFI's The Handyscanner 3000 Plus*
- *ECA C&C Products, Inc.'s A4Scan AS8000P*
- *Esco Systems, Inc.'s Skyscan D-120*

Source: New Art, Inc.

Buy/Sell/Lease

The BoCoEx index on used computers

Closing prices report for the week ending October 26, 1990

	Closing price	Recent high	Recent low
IBM PC Model 176	$375	$450	$200
XT Model 086	$500	$550	$450
XT Model 089	$550	$625	$400
AT Model 099	$650	$975	$500
AT Model 239	$875	$1,025	$700
AT Model 339	$925	$1,100	$900
PS/2 Model 30-286	$1,250	$1,300	$1,125
PS/2 Model 60	$1,500	$1,800	$1,400
PS/2 Model 70P	$3,425	$3,450	$3,175
Compaq Portable II	$900	$1,050	$875
Portable 286	$1,275	$1,450	$1,100
SLT 286	$2,500	$2,625	$2,000
Portable 386	$2,600	$2,800	$2,500
LTE 286	$2,000	$2,100	$1,850
Deskpro 286	$1,375	$1,400	$1,200
Deskpro 386/20	$2,900	$3,100	$2,400
Apple Macintosh Plus	$750	$975	$700
SE	$1,200	$1,450	$1,200
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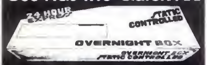

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Managers must learn to share responsibilities with trainers

BY SUE REDKEY
SPECIAL TO CW

Training is not a responsibility that belongs only to trainers. Managers have to pitch in too, if they want to be sure that the right training is being delivered to the right people at the right time. In the same way that information systems managers expect their clients to be involved with the systems being developed for them, trainers need input from IS managers for training effectiveness.

Case in point: When Janet Green and Tom Rebstock, both technical trainers at the Texas Highway Department in Austin, conducted a survey of people who had received personal computer training during 1989, they found that 41% reported little or no productivity gain. Why? Because most of the 41% didn't have access to a PC on the job. Yet their managers had approved their training. This case may represent an extreme, but the point is still valid. What if someone on your staff really needed that training but couldn't get into a class because it was filled with people who didn't need it?

You can help prevent this kind of ineffectiveness and encourage other managers by your example. Here are some ways that you can become more involved in in-house training:

- **Take an active role in planning training for your staff.** Know who needs what training within what time frame, and be clear about priorities. Agree on these points with each staff member, making training plans part of performance expectations where you can [CW, Jan. 29].

If you feel there's no point in this kind of planning because classes never seem to be offered when your staff members need them, remember that trainers can't read minds. It is up to you to speak up and communicate your needs and priorities.

- **Be supportive.** When you send your people to in-house training classes, don't interrupt them to troubleshoot a problem in your department. That will disrupt their concentration and imply that you think training is not all that important.

Maintain an environment that makes it easy for them to apply new skills and concepts in your group. Participants often come back to the job all fired up with enthusiasm for what they have learned, but if that enthusiasm is stifled, much of the learning is lost.

Demonstrate your commitment to their training by showing some interest in the topic. For instance, if you send someone to a computer-aided software engineering class, read a few articles on that subject. That way, you'll put yourself in a more informed position to support the person being trained.

Also, be selective about which classes you send people to. What they can't use, they'll lose, so wait until the time is right.

- **Put yourself into the feedback loop.** One of the most valuable things you can do is assess the effectiveness of training in terms of your needs and expectations — then pass on your findings to the training department. Remember, you are their client, so they need to know how they can be more effective in serving you.

Be clear about exactly what your needs and expectations are so you have some standards by which to measure results. When your employee returns from class, ask for feedback — not just whether he had a good time, but whether he feels the class gave him what he needs in order to meet your performance expectations. You might even request a written report of the experience.

Assess training effectiveness again two to three months after the class. By this time, that person will have a much better idea of whether the class was appropriate to his needs.

Despite the fact that postcourse evaluations provide the most insightful feedback, they're not conducted regularly enough. The best way to know how to make the course more effective is to know how the learners perform within their jobs after training.

- **Take the initiative.** Don't wait to be asked; your training department needs your involvement whether they have had time to formally request it or not. If the system could work better, it's up to you to identify where and how.

Redkey is an independent instructor, writer and consultant and author of ***The Technical Instructor's Handbook: From Techie to Teacher.***

Tailored for changing times

Toni Griskivich at Unum Life Insurance Co. in Portland, Maine, has been responsible for the company's entry-level programmer training program for years. To perform this job effectively, she developed a post-evaluation technique that involved active participation of managers and students alike: Not only did she encourage input from managers on a continual basis, but three months after graduation, she would meet with the manager and the former student to get feedback on various aspects of the program.

With this kind of partnership approach, the structure of the program has evolved. What began as a self-study approach mentored by programmers in their spare time grew into a 14-week program taught by two full-time instructors. Still evolving, the program is now taught on-site by a vendor in 11 weeks with technical consultation from Griskivich.

Based on feedback over the years, the involvement of mentors has increased or decreased depending on current needs. The team project has changed from a live project to a case study and no longer stresses competition among teams in class.

Griskivich is the first to admit that all of this tailoring takes a lot of time and effort on everyone's part, but she and her clients both know that without this kind of involvement, there is no way she can deliver what they need and expect.

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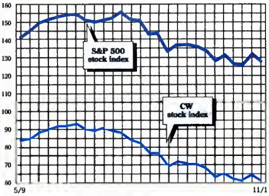

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Communications	98.8	**97.9**
Computer Systems	62.9	**59.4**
Software & DP Services	91.0	**87.6**
Semiconductors	37.6	**36.6**
Peripherals & Subsystems	70.8	**67.0**
Leasing Companies	54.8	**50.5**
Composite Index	64.2	**61.4**
S&P 500 Index	132.0	**128.4**

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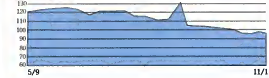

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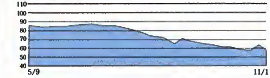

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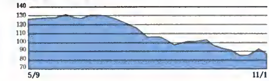

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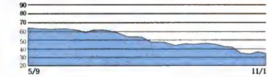

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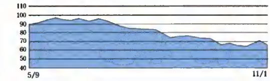

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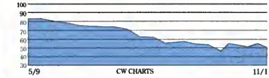

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Communications and Network Services

EXCH		PRICE 52-WEEK RANGE		PRICE CLOSE OCT. 31, 1990	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	68	53	65.75	0.0	0.0
Q	ANDREW CORP	26	16	17	-0.3	-1.4
Q	ARTEL COMM CORP	10	2	2.5	0.4	17.6
N	AT&T	47	30	34	0.6	1.9
Q	AVANTEK INC	5	2	1.625	-0.1	-7.1
N	AYDIN CORP	19	10	10.75	0.3	2.4
N	BELL ATLANTIC CORP	67	40	52.25	1.3	2.8
N	BELLSOUTH CORP	59	49	52.75	0.8	1.4
Q	COMPRESSION LABS INC	16	7	14.25	-0.3	-1.7
Q	CONTEL CORP	36	23	33.5	-0.5	-1.5
Q	DATASWITCH CORP	4	2	3	0.0	0.0
Q	DIGITAL COMM ASSOC	27	9	9.625	0.1	1.3
Q	DYNATECH CORP	19	12	15	0.8	5.3
Q	FIBRONICS INTNL INC	13	5	7.25	-0.8	-9.4
Q	GANDALF TECHNOLOGIES	6	2	2.375	0.0	0.0
N	GENERAL DATACOMM INDS	6	2	1.625	-0.4	-18.8
N	GTE CORP	36	24	28.25	-0.3	-0.9
Q	INFOTRON SYS CORP	9	1	1.75	0.0	0.0
N	ITT CORP	61	40	43.125	-1.5	-3.4
N	M A COM INC	6	3	4.375	0.0	0.0
Q	MCI COMMUNICATIONS CORP	48	28	30	-1.1	-3.6
N	NETWORK EQUIP TECH INC	34	6	5.375	-0.5	-8.5
Q	NETWORK SYS CORP	15	7	6.375	0.1	1.5
N	NORTHERN TELECOM LTD	30	21	26.375	0.8	2.9
Q	NOVELL INC	29	12	24.75	0.8	3.1
N	NYNEX CORP	92	67	68	-2.6	-3.7
N	PACIFIC TELESIS GROUP	52	36	45	0.5	1.1
A	PENRIL CORP	9	6	5.75	-0.1	-2.1
N	PLESSEY PLC	42	39	0.01	0.0	0.0
N	SCIENTIFIC ATLANTA INC	29	9	9.625	-4.0	-29.4
N	SOUTHWESTERN BELL CORP	66	47	54.5	1.0	1.9
Q	3 COM CORP	19	5	6.875	1.1	19.6
N	U S WEST INC	41	32	37	-0.6	-1.7

Computer Systems

EXCH		PRICE 52-WEEK RANGE		PRICE CLOSE OCT. 31, 1990	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	9	1	1.375	-0.5	-26.7
Q	ALPHA MICROSYSTEMS	5	1	1.625	-0.3	-13.3
A	AMDAHL CORP	19	10	11.375	0.4	3.4
Q	APPLE COMPUTER INC	48	24	30.75	0.3	0.8
Q	AST RESH INC	26	9	20.75	0.8	3.8
N	BOLT BERANEK & NEWMAN	8	4	4.75	-0.4	-7.3
N	COMPAQ COMPUTER CORP	68	36	46.625	-0.9	-1.8
N	COMMODORE INTNL	12	5	7.375	1.0	15.7
Q	COMPUTER AUTOMATION INC	6	0	1.032	0.2	26.9
N	CONTROL DATA CORP	22	8	8.25	-1.4	-14.3
N	CRAY RESH INC	61	20	23.625	-1.3	-5.0
N	DATA GEN CORP	14	4	4.25	-0.8	-15.0
N	DATAPOINT CORP	5	1	1.25	-0.1	-9.1
Q	DELL COMPUTER CORP	14	5	10.625	-0.4	-3.4
N	DIGITAL EQUIP CORP	95	46	47.5	-4.3	-8.2
N	FLOATING POINT SYS INC	4	0	1.375	0.0	0.0
N	HARRIS CORP	37	14	16	-1.0	-6.3
N	HEWLETT PACKARD CO	50	26	26	-3.4	-11.5
N	HONEYWELL INC	112	71	82.625	-1.1	-1.3
N	IBM	123	93	105.5	-3.1	-2.9
Q	INFORMATION INTL INC	14	8	9.25	0.5	5.7
Q	IPL SYS INC	14	5	8.875	-0.6	-6.6
N	MAI BASIC FOUR INC	4	1	1.125	-0.4	-25.0
N	MATSUSHITA ELEC INDL LTD	166	118	135.75	-5.3	-3.7
Q	MENTOR GRAPHICS CORP	28	9	9.625	-0.4	-3.8
N	NBI INC	1	0	0.156	0.0	-9.3
N	NCR CORP	72	45	47.25	-4.0	-7.8
Q	PYRAMID TECHNOLOGY	36	13	13.6	-5.0	-27.0
Q	SEQUENT COMP SYS INC	34	13	16	-0.8	-4.6
Q	SUN MICROSYSTEM INC	37	16	18	0.3	1.8
Q	SYMBOLICS INC	2	0	0.313	0.1	25.2
N	TANDEM COMPUTERS INC	30	9	9.376	-2.8	-21.9
N	TANDY CORP	44	24	23.875	-1.3	-5.0
N	ULTIMATE CORP	10	2	2	-1.0	-33.3
N	UNISYS CORP	17	2	2.25	-1.3	-35.7
A	WANG LABS INC	8	3	2.875	-0.3	-8.0

Software & DP Services

EXCH		PRICE 52-WEEK RANGE		PRICE CLOSE OCT. 31, 1990	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
Q	AMERICAN MGMT SYS INC	20	11	14.25	-0.6	-4.2
Q	AMERICAN SOFTWARE INC	18	8	10	0.1	1.3
N	ANACOMP INC	5	1	2.125	-0.1	-5.6
Q	ANALYSTS INTL CORP	24	10	12.25	-0.3	-2.0
Q	ASHTON TATE	15	5	6.75	-0.6	-8.6
N	AUTO DATA PROCESSING	60	44	50.375	-0.8	-1.5
Q	AUTODESK INC	60	32	38.25	-2.8	-6.7
Q	BMC SOFTWARE INC	30	16	19.75	-3.3	-14.1
N	BUSINESSLAND INC	12	1	1.75	0.1	7.7
Q	COGNOS INC	10	4	6.625	-0.1	-1.9
N	COMPUTER ASSOC INTL INC	17	4	7	-0.1	-1.8
Q	COMPUTER HORIZONS CORP	17	8	13.125	0.6	5.0
N	COMPUTER SCIENCES CORP	59	37	42.625	2.1	5.2
N	COMPUTER TASK GROUP INC	12	7	7.375	-0.5	-6.3
Q	COMSHARE INC	25	14	17	-0.8	-4.2
Q	CORPORATE SOFTWARE	16	4	4.5	-1.0	-18.2
N	GENERAL MTRS (CLS E)	36	24	32.625	-1.9	-5.4
Q	HOGAN SYS INC	7	2	2.125	-0.1	-5.6
Q	GOAL SYSTEMS INTL	16	8	7.75	-2.25	-22.5
Q	INFORMIX CORP	16	4	3.625	-0.8	-17.1
Q	INTELLICORP INC	6	1	1.688	-0.4	-20.6
Q	LEGENT CORP	31	17	18.25	-1.5	-7.6
Q	LOTUS DEV CORP	39	13	17.25	2.0	13.1
Q	MICROSOFT CORP	81	38	63.75	-1.6	-2.5
Q	NATIONAL DATA CORP	35	8	10.125	1.0	11.0
N	ON LINE SOFTWARE INTL INC	11	4	4.25	0.0	0.0
Q	ORACLE SYS CORP	188	5	5.375	-0.6	-10.4
N	PANSOPHIC SYS INC	19	7	7.75	-0.1	-1.6
Q	PHOENIX TECHNOLOGIES INC	5	2	1.75	-0.1	-6.7
N	POLICY MGMT SYS CORP	43	30	37.625	-1.4	-3.5
Q	PROGRAMMING & SYS INC	25	10	10	-1.5	-13.0
Q	RELATIONAL TECH INC	10	3	9.125	0.0	0.0
N	REYNOLDS & REYNOLDS CO	27	12	11.75	-1.3	-9.6
Q	SAGE SOFTWARE INC	16	8	10.5	-1.5	-12.6
Q	SEI CORP	22	15	16	-0.5	-3.0
Q	SHARED MED SYS CORP	17	12	15.25	-0.1	-0.8
Q	SOFTWARE PUBG CORP	28	12	13.5	-2.6	-15.6
N	STERLING SOFTWARE INC	11	6	7	-0.1	-1.8
Q	SUNGARD DATA SYS INC	26	10	10.5	-0.3	-2.3
N	SYSTEM CENTER INC	25	6	7.625	-0.6	-9.0
N	SYS. SOFT INC	29	13	19.25	0.3	1.3
Q	WORDSTAR	2	1	1	0.2	23.0

Semiconductors

EXCH		PRICE 52-WEEK RANGE		PRICE CLOSE OCT. 31, 1990	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	11	4	3.875	-0.1	-3.1
N	ANALOG DEVICES INC	10	8	6.75	-0.1	-2.1
Q	ANALOGIC CORP	10	8	6.5	0.1	1.5
Q	CHIPS & TECHNOLOGIES INC	24	5	6	0.0	0.0
Q	INTEL CORP	52	28	33.5	-1.5	-4.3
Q	MICRON TECHNOLOGY INC	16	7	7.875	0.0	0.0
N	MOTOROLA INC	66	51	53.875	-0.5	-0.9
N	NATL SEMICONDUCTOR	9	3	3.375	-0.4	-10.0
N	TEXAS INSTRS INC	44	23	24	-0.9	-3.5
A	WESTERN DIGITAL CORP	15	5	5.625	-0.4	-6.3

Peripherals

EXCH		PRICE 52-WEEK RANGE		PRICE CLOSE OCT. 31, 1990	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
Q	ALLOY COMP	2	0	0.5	-0.1	-20.0
N	AM INTL INC	6	1	1	-0.3	-20.0
Q	AUTO TROL TECH CORP	4	2	2	-0.3	-11.1
Q	BANCTEC INC	24	10	10.5	-1.0	-8.7
A	COGNITRONICS CORP	8	3	5.25	0.1	2.4
Q	CONNER PERIPHERALS	31	11	23.125	-0.4	-1.8
A	DATARAM CORP	22	8	8.25	0.0	0.0
N	EASTMAN KODAK CO	45	34	39.75	-0.1	-0.3
N	E M C CORP MASS	7	3	6.75	0.0	0.0
Q	EMULEX CORP	9	4	4.875	0.0	0.0
Q	EVANS & SUTHERLAND	36	16	16.5	-1.5	-8.3
Q	ICOT CORP	2	0	0.5	0.1	14.2
Q	INTERLEAF INC	6	3	3.25	0.0	0.0
Q	IOMEGA CORP	6	3	4.063	-0.4	-8.4
Q	MASSTOR SYS CORP	3	0	0.563	0.0	0.0
Q	MAXTOR CORP	17	4	4.75	-0.1	-1.3
Q	MICROPOLIS CORP	10	3	5.6	-0.6	-8.3
N	MINNESOTA MNG & MFG CO	91	71	79	0.8	1.0
Q	PERSONAL COMP PRODUCTS INC	6	4	3.76	0.1	3.4
Q	PRINTRONIX INC	16	6	8.563	0.6	7.0
N	QMS INC	21	8	11.876	-1.6	-12.0
Q	QUANTUM CORP	26	9	18.376	-0.1	-0.7
N	RECOGNITION EQUIP INC	8	4	6	0.0	0.0
Q	REXON INC	10	4	6	0.3	4.3
Q	SEAGATE TECHNOLOGY	20	6	7.375	-0.1	-1.7
N	STORAGE TECH CORP	35	11	13.876	-1.1	-7.5
Q	TANDON CORP	4	1	1.688	-0.2	-10.0
N	TEKTRONIX INC	19	12	15.25	-0.3	-1.6
Q	TELEVIDEO SYS INC	1	0	0.25	-0.1	-20.1
N	XEROX CORP	60	29	29.5	-1.1	-3.7

Leasing Companies

EXCH		PRICE 52-WEEK RANGE		PRICE CLOSE OCT. 31, 1990	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
N	CAPITAL ASSOC INTNL INC	5	1	0.875	-0.2	-17.7
N	COMDISCO INC	31	16	16	-0.4	-2.3
Q	LDI CORPORATION	18	10	10.25	-0.4	-3.5
Q	PHOENIX AMERN INC	6	3	4.76	-0.1	-1.3
Q	SELECTERM INC	7	3	3	-0.5	-14.3

EXCH: N = NEW YORK; A = AMERICAN; Q = NATIONAL

Share dance

Tech stocks hit the floor for some quick dips and jumps

Although they were not dancing in the street, technology stocks were up and moving last week. Investors grabbed selected firms for a quick turn around the trading floor, including AST Research, Inc. After rolling out a new Intel Corp. I486-based personal computer on Monday, AST had its dance card filled for the rest of the week, gaining 2⅛ points to 21¼ by closing time Thursday. IBM's introduction of its I486 machine evidently tickled fewer traders, as IBM picked up just ⅛ of a point to close Thursday at 107¼.

Lotus Development Corp. had Wall Streeters twisting and shouting about Samna Corp. after Lotus publicized its impending takeover of the word processing software maker. Samna shot up 6⅝ points to 7⅜, while Lotus waltzed away with an additional 2 points by Thursday, closing at 17½. Motorola, Inc.'s computer group beat out both Digital Equipment Corp. and IBM for a $55 million contract with the state of Tennessee, then jumped up 2⅛ points to close at 55⅝.

Not everybody joined the party, however. DEC could not sustain the rally started the week before last and dipped one point to 48⅝. Novell, Inc. also lost, down 1⅜ points to 24⅜.

Last week's action was largely a passel of small slips and gains. Hewlett-Packard Co. stumbled ⅞ of a point to close at 27¼, and Sun Microsystems, Inc. eased back ⅛ of a point to 16. Microsoft Corp. moved up just ⅛ of a point to 63½ as Oracle Systems Corp. slid backward by ⅛ of a point to 5½. Autodesk, Inc. jumped one point to 39½.

Disk-drive maker Seagate Technology, Inc., due to release new products today, hopped up ⅜ of a point last week to 7⅜, while rivals Conner Peripherals, Inc. remained steady at 22⅜ and Quantum, Inc. edged up ⅛ of a point to 17⅞.

KIM S. NASH

NEWS SHORTS

DG losses mount

Continuing on its steady losing streak, Data General Corp. posted a net loss of $89.3 million, or $2.93 per share, for 1990 fourth-quarter results. Company President Ronald L. Skates is publicly maintaining a stiff upper lip, stating that although overall revenue is down, DG is realizing "substantial" revenue gains from its Aviion family of Unix-based workstations. The operating loss for the quarter was $88.2 million, which included a $71.7 million restructuring charge. In 1989, fourth-quarter losses totaled $84.1 million, or $2.86 per share, and included a restructuring charge of $80 million.

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Getting out the vote, fax style

Sure, every vote counts. But when you are pressed into service and shipped out to Saudi Arabia on a moment's notice, arranging to vote by absentee ballot sometimes gets lost in the scramble. Thanks to facsimile technology, the votes of about 3,000 Operation Desert Shield troops will still be included in the tallies tomorrow night, said Henry Valentino, director of the Federal Voting Assistance Program. AT&T donated service and equipment to set up Desert Fax.

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Landmark buys monitor

Landmark Systems Corp. said it reached an agreement in principle to acquire Critique/VTAM, a performance monitoring tool from Highland Research, Inc. Landmark currently offers monitoring tools for IBM's DB2, CICS and the MVS operating system. The sale is scheduled to be completed next month.

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Samsung expands PC line

Samsung Information Systems America is expected to announce today an Intel Corp. 80386SX-based notebook computer and three high-end desktop machines designed for use in the networking market. All the machines will begin shipping in December. The notebook, called the Notemaster 386S/16, will weigh six pounds and will come standard with a 20M-byte hard drive, upgradable to 40M bytes — and eventually to 60M bytes. The 16-MHz machine will retail for $4,499. Samsung's three Systemmaster desktop machines include a file server based on Intel's I486 chip.

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AI Corp. maps strategy

AI Corp. last week sketched out some product plans for next year. It plans to begin shipping a Unix version of its Knowledge Base Management System (KBMS) in the first quarter of 1991. Initially, it will provide KBMS for Digital Equipment Corp.'s Ultrix. Also, the company said a version of its 1st-Class expert system software, which will support Microsoft Corp.'s Windows 3.0, will be available in the first half of next year.

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Motorola details image system

Motorola, Inc. said last week it will demonstrate a Unix image processing application for its Multi-Personal Computer — announced in March — at next week's Comdex/Fall '90 show. The product, which will not be formally announced until after Comdex, will reportedly integrate scanning, facsimile, graphics and compact disc/read-only memory technologies to cost-effectively bring imaging to the desktop. A spokesman said Motorola is "not out to tackle the high-performance imaging market" but is instead aiming its software at companies that do not need extremely high-performance imaging.

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Epoch offers storage package

Network storage vendor Epoch Systems, Inc. last week announced its Renaissance storage management architecture, which encompasses distributed applications for automatic management, backup and archiving of magnetic disk storage on workstations and servers. Priced from $1,500 to $15,000 and aimed at multivendor, client/server environments, the Renaissance Infinite Storage software automatically scans disks and migrates the least-used files to an Epoch-1 server.

Budget battle spares high tech

BY GARY ANTHES
and MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Largely obscured by the uproar over the federal budget, the 101st Congress passed a bushel of last-minute bills benefiting the computer community.

While the bipartisan agreement to reduce the federal deficit by $492 billion over five years imposes painful spending caps overall, funding for computer technology fared surprisingly well in budget bills just passed by Congress for the fiscal year that began Oct. 1.

"Most of what we supported passed, and what we opposed didn't," said Luanne James, executive director of Adapso, the computer software and services industry association. "But, of course, it was a real cliff-hanger."

Congress approved a bill that relaxes restrictions on the export of computer and telecommunications equipment. It requires the government to automatically update the performance-level thresholds for computers allowed for export, and it mandates that the cutoff for export to most countries will not be set lower than 25% of the processing speed of the fastest two commercially available systems.

The bill also provides for largely license-free exports to the 17 Coordinating Committee for Multilateral Export Controls countries, and it adds that hardware and software used in computer networks will not be more tightly controlled than the computers these products interconnect. The Bush administration has expressed reservations about the bill, so a presidential veto is a possibility.

Congress passed, and the president is expected to sign legislation specifying that state institutions and employees are liable for money damages and other remedies for copyright infringement. In another bill, Congress said software copyright owners may bar the rental of their software.

In addition to a bill that exempts many programmers from overtime pay (see story page 1), Congress also took some minor action on the controversial Section 1706, which has prompted many independent computer consultants to become employees unless they meet stringent rules proving their independence. The U.S. Department of the Treasury was ordered to finish its overdue report on the revenue effects of Section 1706 by February 1991.

Supporters and opponents of Section 1706 said the results of the study, originally due in September 1989, will play a major role in determining whether Section 1706 is repealed.

The Senate approved, but the House did not consider, a bill that would create a nationwide research network and foster research in high-performance computer systems. However, $35 million for the initiative was added to the combined budgets of the Defense Advanced Research Projects Agency and the National Aeronautics and Space Administration.

The National Institute of Standards and Technology is to get $11.3 million for its computer programs, a 20% boost. More than half the increase is to go toward the agency's work in computer security. The Advanced Technology Program, which funds private technology consortiums, will get $36 million, $26 million more than last year.

Other computer-related legislation passed in the closing days of the 101st Congress included the following:

- Extension of the business tax credit for research and development expenditures through Dec. 31, 1991.
- Extension through 1991 of a moratorium on regulations that would otherwise require U.S. firms to allocate some of their R&D expenses to foreign income taxes, thus reducing their U.S. tax credit.
- Establishment of chief financial officer positions at all major federal agencies. In addition, the bill establishes a presidentially appointed super-CFO within the Office of Management and Budget.

An effort to modernize the 1984 Computer Fraud and Abuse Act is dead for now. The Senate passed, but the House failed to consider, extending the legal concept of computer "access."

Outsource

FROM PAGE 1

Seltmann, Cobb and Bryant, Inc. in Memphis, to take over its IS management. Nashville Electric said that the pact, valued between $35 million and $45 million, will save it $16 million over the seven years.

Last week's unusual legal action underscores one of the major downsides of the current outsourcing trend: staff uncertainty about involuntarily gaining a new employer or a layoff notice.

"No one had any opportunity to get another job if they don't want to work for [Seltmann Cobb]," said attorney Aleta Arthur Trauger, who in an Oct. 30 filing on behalf of NESEA sought an injunction to prevent the utility from finalizing the contract.

Nashville Electric spokeswoman Teresa Corlew said she did not know if the utility board would proceed despite the lawsuit. "Everyone can see that this is a good move for the electric service," she said. "It's a big change, something that our employees are not used to, and there is a natural apprehension."

The suit also charged that the utility's failure to put the contract out for public bid violates the city's purchasing policies and that Nashville Electric board members held private meetings to discuss the contract in violation of state public meeting laws. The first public discussion, according to Trauger, came during an Oct. 17 meeting at which a public relations representative distributed press releases announcing the intention to outsource to Seltmann Cobb.

Corlew said that Nashville Electric has received legal opinions from its attorneys that "the board does not have to bid professional services contracts."

The letter of intent between Nashville Electric and Seltmann Cobb stated that Seltmann Cobb will offer employment to the utility's IS employees at the beginning of the contract. The press release quoted Nashville Electric board chairman Mike Hampton as saying of the IS employees, "We think these talented individuals will be excited about this new career opportunity."

But Hampton was sorely mistaken, according to Trauger. "All of them should be given the opportunity to find another job in [Nashville Electric]," she said. "Under the city charter, the board must consider their seniority and performance."

Seltmann Cobb has been a major software development contractor to Nashville Electric, helping complete a rewrite of the utility's core applications, such as billing and financial control, to run on its IBM 3090-200J mainframe. However, an Arthur Andersen & Co. audit of Seltmann Cobb's performance earlier this year was highly critical, charging the vendor with questionable costs, missed deadlines and excessive rates.

"Those problems have been solved," Corlew said.

The Andersen audit report also noted that the Nashville Electric contract accounted for 55% of Seltmann Cobb's total revenue for the previous year.

PS/2 server could cost Compaq

BY RICHARD PASTORE
CW STAFF

NEW YORK — The long-anticipated IBM Personal System/2 servers debuted last week to mixed reviews. However, the buying public seems to be applauding the systems, which have arrived none too soon for some and a bit too late for others.

The PS/2 Model 95 has apparently already cost rival Compaq Computer Corp. a Systempro sale. "IBM has a competitive enough product here that we'll probably go with it," said Robert Martin, manager of business systems at Gibson Greetings, Inc. in Cincinnati.

If IBM had been two weeks later with the announcement, "we definitely would have gone with the Systempro," said Martin, who plans to attach 80 personal computer nodes to the server as part of a corporatewide network.

Although IBM made it in under the wire at Gibson, it was too slow for other firms. "If it had been announced and was shipping, we might have considered it," said Bob Jahreis, assistant vice-president of development at Corporate Health Strategies in Westport, Conn. The company broke with its tradition of buying only IBM and Compaq machines last month and ordered an Intel Corp. I486-based server from Dell Computer Corp.

The desktop PS/2 Model 90 and deskside Model 95, which began shipping last week, are both targeted as servers. However, the Model 90 is also appropriate for graphics work and intensive number-crunching, IBM spokesmen said.

The box's most often-praised feature was the upgradable CPU. The 25-MHz 486 chip can be swapped for a 33-MHz CPU and, eventually, the 50-MHz version and rumored Intel I586, according to IBM.

"The flexibility to upgrade without replacing the entire box definitely has appeal," Martin said. When considering server choices, he decided against the PS/2 Model 80 because it lacked an upgrade option, be noted.

Head to head

IBM is pitting its new servers against Compaq's Deskpro

	IBM		Compaq
	PS/2 Model 95	PS/2 Model 90	Deskpro 486/33L
Processor	I486 25 or 33 MHz	I486 25 or 33 MHz	I486 33 MHz
Bus	Micro Channel	Micro Channel	EISA
Disk	SCSI, 160M or 320M bytes	SCSI, 80M, 160M or 320M bytes	ESDI, 120M to 650M bytes
Cache	8K to 256K bytes	8K to 256K bytes	128K bytes
RAM	4M to 32M bytes	4M to 32M bytes	4M to 100M bytes
Graphics	XGA	XGA	VGA
Price	$14,145 to $17,745	$12,495 to $16,695	$13,999 to $19,499

CW Chart: Doreen St. John

Upgradability is a trend in PC architecture that began among second-tier vendors such as AST Research, Inc. and Advanced Logic Research, Inc. (ALR) and has now been validated by Compaq and IBM, Meta Group, Inc. analyst Frank Michnoff said.

Though they were pleased by the upgrade option, some observers were disappointed with IBM's decision not to employ disk-array technology in the servers.

"We like the disk array of the Systempro and the fact that you don't have to totally mirror your disks transaction for transaction," Martin said. With the PS/2s, "you'll end up spending more for disks if you truly want to mirror your drives."

Expert opinions conflicted on the potential success of the new PS/2s. "I think IBM has direct competitors for the Systempro bere. These two boxes will be dynamite for server applications," said Steve Lair, chief PC analyst at Dataquest, Inc. in San Jose, Calif.

Others were not so optimistic. "Except for XGA, nothing about the technology impresses me," said Michnoff, who predicted IBM will lose market share in the next three years despite the debuts.

Compaq does not view the PS/2s as competitors for its multiprocessor Systempro, product marketing manager Lorie Strong said. They are different types of machines, she said, adding that the IBM entries more closely parallel the single-processor Compaq Deskpro 486/33L.

While IBM's prices parallel Compaq's, there are several servers from the likes of Dell and ALR that undercut the IBM price by many thousands of dollars. However, some analysts said IBM need not worry unduly, because superserver buyers have typically been more interested in performance and reliability than in price.

The IBM boxes may find themselves pitted against IBM's own products, analysts warned. Several said the machines could compete for sales with the RISC System/6000 workstation and Application System/400 minicomputer as well as the 486-equipped PS/2 Model 70.

IBM dubs XGA as video display 'standard'

BY MICHAEL FITZGERALD
CW STAFF

NEW YORK — Extended Graphics Array, or XGA, the video graphics controller announced last week for IBM's new Personal System/2 Model 90 and Model 95 Intel Corp. I486-based computers, was called "the new standard" for video display by James Cannavino, IBM vice-president and general manager of personal systems.

While XGA makes immediate sense on the Model 90, which is being positioned as a machine for computer-aided design, some have questioned why the Model 95, primarily a file server, needs such high resolution.

The answer is that IBM wants it to be a desktop standard and bringing XGA in on the high end mirrors its approach to creating its Video Graphics Array (VGA) and Extended Graphics Adapter (EGA) standards.

XGA offers significant improvements over IBM VGA, starting with 1024- by 768-pixel resolution, compared with VGA's standard 640- by 480-pixel resolution. XGA supports 16 bit/pixel color as well, giving it "perfect" video, or color, that the human eye cannot tell from true, 24-bit color. It is also much faster and provides better detail than many third-party Extended VGA boards that feature the same resolution as XGA and far outperforms IBM's current 1,024- by 768-pixel resolution 8514/A card, which IBM said it will position as a high-performance card for Intel 80286-based computers.

IBM also announced a PS/2 XGA Display Adapter/A, a $1,095 add-on card that will allow users of Intel 80386SX-, 80386DX- and I486-based machines to upgrade, as long as they use DOS 3.3 or higher.

"As graphical user interfaces become more popular, users are going to need this type of resolution," said Tara Sexton, a spokeswoman for IBM.

The problem with XGA, according to Jon Peddie of PC graphics consulting firm Jon Peddie Associates in Oakland, Calif., is that users will have difficulty gaining its benefits without purchasing 19-in. monitors or font-emulation software.

Systempro

CONTINUED FROM PAGE 1

pieces would be available by the first quarter of this year, but customers were not able to evaluate the complete solution until the third quarter," said Michael Swavely, president of Compaq North America.

Though the software snafus — now resolved — delayed sales significantly, Swavely claimed that the Systempro has met sales expectations. To stifle critics who earlier cited slow unit sales (see chart page 1), Compaq has broken with tradition and cited its own numbers. "We expect it to be a $200 million business for us in its first year of shipment," Swavely said.

That figure compares favorably with the first-year revenue of Compaq's successful Deskpro 386 and 386S products, be added. However, since the pricey Systempro requires a more complex, longer sales cycle, "unit volumes are not the same as you see in $3,000 and $4,000 PCs," Swavely said.

Slow start

Yet, even Compaq dealers were disappointed that the machines took off so slowly. "I don't think it sold the way everyone anticipated, but it's just now starting to pick up to the point where people are actually interested in it," said Systempro reseller Pat Calabrese, a sales representative at Tampa, Fla.-based dealer Monterey Waldec.

Part of the reason for the pickup may be the release of the Intel Corp. I486 version in July, analysts said. Good word of mouth has also helped.

Indeed, early users have high praise for the Systempro's reliability and performance. "They've exceeded my expectations in speed and reliability," said Coca-Cola Foods project director Frank Vander Horst, who claimed to own the very first machine released. "We have not had any downtime related to the Systempro."

Nevertheless, critics have called the design of the dual processors inefficient. All I/O operations flow through the first processor, while only some functions are shuttled to the second processor, noted Ed Bell, a senior systems analyst at systems integrator H.V. Jones Co. Consequently, "What you end up with is not two processors, but really one and a half."

Compaq's Swavely: *Long wait*

Many users who took the early plunge into this technology had initial doubts. "We were very hesitant to leave the IBM fold, but IBM just didn't offer a product that was comparable to the Systempro when you consider dollars spent and upgradability," said Joseph Duane, president of Medical Cost Control, Inc. in Tampa. He acquired a 386-based Compaq unit in February. Tbe company runs its entire business on PC networks.

Duane is running Unix on the system, but he and others are still waiting for the arrival of specific applications to take advantage of the dual processors.

"Operating systems do not applications make," said Steve Lair, chief PC analyst at Dataquest, Inc. in San Jose, Calif. The applications are still a missing element that has kept the product from taking off as a minicomputer replacement, he said.

Swavely offered tacit agreement, noting that Compaq confused the market by initially positioning the machine as a minicomputer replacement as well as a file server.

Indeed, most users are using the machine as a server rather than as a minicomputer replacement, observers said. Faced with a choice, many still favor minis. Coopers & Lybrand in New York evaluated the Systempro but chose a Digital Equipment Corp. VAX 4000 mini for its 2,500-node network.

"I can grow that VAX 4000 to an extremely powerful animal that will outrun any Systempro ever built," said Stephen Rood, microcomputer technology manager at Coopers & Lybrand.

Despite these snags, the Systempro has successfully carved a new niche in its first year, analysts said. "It's succeeded in bringing users' attention to this wbole area," Michnoff said. "It's an important precursor to a lot of what we believe is going to happen — faster engines, multiple engines and disk arrays."

OS/2

CONTINUED FROM PAGE 1

Microsoft will provide 1.3 to interested hardware OEMs. Pat Bellamuh, Microsoft's OS/2 marketing manager, agreed with IBM that 1.3 is fully featured but offered a caveat: "It doesn't install in 2M bytes if you have a network installed, and we have found that you can't install OS/2's High Performance File System in 2M bytes." An IBM spokeswoman said that users on a 2M-byte system can take advantage of most HPFS features.

"OS/2 SE 1.3 goes above and beyond our original goal. [It] is the highest quality version of OS/2 ever available," claimed Lee Reisweig, vice-president of programming at the Entry Systems Division. SE Versions 1.2 and 1.2.1 of OS/2 are still on the market.

IBM claims OS/2 1.3 is significantly faster than its predecessors in some cases. Most users will find they can load network programs two to three times faster than under OS/2 1.2, IBM said. Users can expect to see "significantly" improved performance for specific systems management functions in memory-constrained environments.

A practical work load consists of one DOS application and up to two OS/2 programs running in just 2M bytes under OS/2 SE 1.3. A new install utility will make more fixed-disk storage available. With OS/2 Extended Edition 1.3, users can run those same applications, along with Extended Edition components such as LAN Requester, in 3M bytes of memory.

Fully functional

Although Version 1.3 requires less memory to run, IBM claimed it does not skimp on functionality. The so-called OS/2 Lite is an amalgamation of the recently released OS/2 1.2.1 and added features, including Adobe Type Manager, which provides built-in support for scalable Adobe Systems, Inc. Postscript fonts and Procedures Language 2/REXX.

Users also get an open font interface that allows them to choose the font technology best suited to their needs.

Despite these "definite improvements," Russell Baris, an assistant director of pharmaceutical systems at Pfizer, Inc. in New York, said that two "significant" problems with OS/2 remain. "The user interface just isn't friendly enough to give to users as a standard platform," he said, explaining that the Presentation Manager interface "is not nearly as simple and as unambiguous a tool to use as is Windows." Then there's support for DOS applications. While the DOS Compatibility Box under OS/2 SE 1.3 is much better, it is still far from perfect, Baris said.

In the event that the economy worsens, choking the flow of IS funds, users and analysts predicted that sites stymied in their desire to upgrade to more powerful hardware might opt instead to power up their 286 machines with OS/2 1.3. Many analysts and users agreed that Microsoft Corp.'s Windows 3.0 is better suited to a 386 platform.

"I think it helps in the 286 market. It's more highly optimized, and it runs better, so it reduces the need for a 386," said Bill Langlais, who heads up the Boston Computer Society's OS/2 special interest group.

Jude Gartland, a senior vice-president at Shearson Lehman Brothers, Inc., said he is looking for a way to beef up his 286 platforms. About two-thirds of his installed base are 286s, and he said he expects it will stay that way during the next two years, due in part to the economy.

Gartland said he expects to compare both Windows 3.0 and OS/2 1.3 on a 286 but expressed reluctance to abandon his DOS applications or spend a lot upgrading old 286 technology. On the other hand, he said, Windows 3.0 really requires a 386. "So I'm assuming for the moment we may not be able to run any [graphical user interface] on our 286s for [a while]."

Packing more punch

IBM also moved last week to bolster the functionality of its OS/2 Server and Extended Edition products.

OS/2 Extended Edition's Communications Manager now enables Asynchronous Communications Device Interface calls to be redirected over the local-area network, allowing attached workstations to share the modem and line-pooling facilities of a server. Extensions to the Batch Configuration Facility streamline systems configuration for environments such as Systems Network Architecture (SNA) Gateway, SNA/Advanced Program-to-Program Communications and Synchronous Data Link Control.

OS/2 LAN Server now provides a DOS LAN requester that supports Windows 3.0.

Also, Ethernet support has been expanded in OS/2 Extended Edition Version 1.3 and OS/2 Lan Server Version 1.3 for both DOS and OS/2 workstations. OS/2 Extended Edition 1.3 costs $830 and is slated to ship by year's end. OS/2 LAN Server 1.3 costs $1,040 and will ship in March 1991.

PATRICIA KEEFE

Citrix creates first OS/2 multiuser edition

BY JAMES DALY
CW STAFF

CORAL SPRINGS, Fla. — An addition to the OS/2 blueprint was sketched in last week when start-up Citrix Systems, Inc. announced that it would produce the first multiuser edition of the OS/2 operating system by the first quarter of next year.

Multiuser, which was developed under a licensing agreement with Microsoft Corp., is a character-based 32-bit extension of OS/2 targeted at large commercial installations. As such, it will play a key part in exploiting OS/2's new role as a more muscular alternative to DOS, Microsoft officials predicted.

Although OS/2 was originally charged with replacing DOS, the two systems have now been given complementary roles, with OS/2 assigned the task of providing backbone support for mission-critical applications and managing large groups of terminals and servers, according to Steve Ballmer, senior vice-president of Microsoft's Systems Divison. "We don't see OS/2 as a replacement for DOS," Ballmer said. "[Multiuser] will help take OS/2 into a new sphere."

While companies such as France's Memsoft offer multiuser shells that fit atop OS/2, Multiuser represents the first multiuser system that incorporates original OS/2 source code, said Citrix Chief Technical Officer Edward Iacobucci, one of several staff members who served on the original OS/2 design team.

As such, it is completely compatible with the large base of Personal System/2 developer tools, and standard OS/2 applications can run on Multiuser right out of the box, said Roger Roberts, president of 18-month-old Citrix. Multiuser will also come with OS/2 Version 1.2.1 already installed on it, he said. Spokesman Michael Stone said it will step up to the just-announced Version 1.3 when it becomes available through Microsoft.

DOS veterans should quickly feel comfortable with Multiuser, which provides the familiar user interface and look and feel of DOS. The package also comes complete with a variety of shrink-wrapped OS/2 applications and affords interoperability with DOS and OS/2 local-area networks. Multiuser ships on four disks, and Citrix officials claim installation takes less than 30 minutes.

Recommended minimum system requirements for Multiuser include an Intel Corp. 80386-based system, 4M bytes of random-access memory and 10M bytes of storage, Iacobucci said.

Multiuser will cost $995 for a five-user package and will initially be distributed by the Ingram Micro D retail outlet chain.

IBM splits service group

WHITE PLAINS, N.Y. — In an apparent effort to boost its outsourcing services business, IBM dismantled its National Service Division (NSD) last week and split outsourcing and related services off from traditional hardware maintenance.

A new Systems Services Division will comprise outsourcing, other facilities management services and disaster recovery support for customers who wish to turn over all or part of their IS management to IBM. Hardware and software service will be part of a new organization, Marketing and Services Quality. Former NSD head David McDowell will oversee the unit.

The new alignment is intended to infuse more marketing muscle into the services area, according to Don Goodspeed, vice-president of services and maintenance strategies at The Meta Group, Inc., a Westport, Conn.-based research and consulting firm. "They have made a lot of investment in services, and it just hasn't paid off," he said. With outsourcing, "you're going against resistance and possibly taking people's jobs away. These are not easy sells."

CLINTON WILDER

Series/1 lands in the grave

BY MICHAEL FITZGERALD
CW STAFF

CINCINNATI — IBM delivered the obituary for its venerable Series/1 minicomputer to members of the Common IBM midrange user group here last week.

Series/1 was introduced in 1976. Figures from International Data Corp. (IDC) show that in 1989, IBM shipped 3,000 of the systems worldwide and had an installed base of 99,890 units — second only to the System/36 among IBM's small systems.

"It was very, very popular — one of those machines that sold without being marketed," said Carolyn Griffin, midrange computer analyst at IDC.

Wayne Kernochen, an analyst at The Yankee Group, said the Series/1's demise means IBM has decided that its RISC System/6000 workstation is going to be a successful product.

"IBM has used [the Series/1] for all it's worth and now has found a new product [the RS/6000] that seems to have replaced it in a lot of customers' minds," Kernochen said.

IBM will not officially withdraw the Series/1 from its marketing plan until February 1.

IBM promised that Series/1 hardware and software maintenance would be unaffected for a minimum of five years and added that it was working with Series/1 users to move their applications to other IBM platforms that will support Systems Application Architecture or AIX environments.

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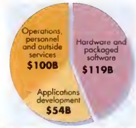
TRENDS

Service & Support

Budget expenditures for IS have been earmarked with almost equal emphasis on personnel and services as on product acquisitions, presenting a healthy market for service providers

Estimated customers' IS budget

(U.S. only)

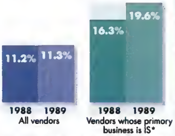


Respondent base: Compilation of eight surveys equaling 4,000 responses

Vendors who focus on IS have more employees devoted to service than do vendors in general

Rising service head count

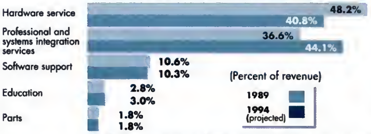
(% of service employees)



*Not including companies that are heavily dependent on alternate service channels

By 1994, vendors expect a large portion of revenue to be generated from professional, systems integration and other services*

Value-added services: Up and coming



*Including network support, help desk, disaster recovery and planning, data center design, facilities management (outsourcing) and custom application development.

Source: The Ledgeway Group, Lexington, Mass.

CW Chart: Paul Mock

NEXT WEEK

Researchers are pairing computer technology and chemistry to create biochips, which promise to be smaller and faster than semiconductors. One group of researchers has linked neural-network computers with an array of biosensors that detect odors, such as toxic fumes in a factory. Read Advanced Technology for more details.

Information systems professionals today are moving out of the back room and into the forefront of business. With that move comes greater decision-making power, influence and visibility — and more stress, pressure and burnout. Read about the pluses and minuses of IS work as In Depth explores the quality of IS life in the '90s.

INSIDE LINES

Fire sale is Next?

With the new Next models on the way, Businessland stores in the Silicon Valley are reportedly cleaning out their stock of the older black cube machines at fire-sale prices: One buyer picked up one of the $8,000 machines for less than $3,000.

Hindsight is 20/20

Microsoft boss Bill Gates told the Chicago Association of Microcomputer Professionals last week that there was definitely a better way to do it. "If we had it to do all over again, we'd call it all DOS — there would be graphical DOS [Windows], Power DOS [OS/2], Advanced DOS . . ." Gates did promise Windows 3.1 by mid-1991, complete with True Type.

The postman only rings twice

3Com reportedly is following in the footsteps of Banyan Systems. The Santa Clara, Calif.-based networking company may be ready to admit that its electronic-mail application is inadequate. 3Com is rumored to be close to an agreement with CC:Mail that would consolidate user directories, as Banyan did with its Vines system.

Thanks for the feed and quiet

There is such a thing as a free lunch, thanks to Hewlett-Packard. About a dozen journalists showed up for a scheduled HP press conference, only to find an abundance of food and the company's representatives nowhere in sight. HP was due to announce a continuation of its joint initiative with Oracle, including joint development, marketing and customer support. According to a press release issued by HP, all those efforts are still under way.

Getting their act together

Also in the category of virtual press conferences at Unix Expo, Motorola's Technical Systems Division called a meeting to discuss its plans to target the Unix server market and later cancelled it. The briefing was cancelled, according to a Motorola spokeswoman, because of some internal confusion as to exactly what slices of the server market the company is after. Motorola is still planning to introduce its server products — part of the Delta family — next March, she said.

Mirror image?

Wang and Data General may not be merging, as persistent rumors would have it, but the companies would neither deny nor confirm talk that they are exploring the possibility of an alliance that would wed Wang's imaging technology — a strong future hope struggling against stiff present odds — to DG's reduced instruction set computing-based platform — a strong future hope strug . . . you get the picture.

Service driven by customers, or awards?

Merrill Lynch is the latest firm to enter the competition for the Malcolm Baldrige Quality Award, information systems chief DuWayne Peterson told the CIO Magazine/AMR International conference in Palm Springs, Calif. Inspired by the recent "Baldy" award to a services company (Federal Express), Merrill Lynch now has the quality bug, Peterson said.

Ah, to be flying high!

While some chief executive officers are ordering their employees to wake up and fly coach class during these financially tough times, CEO Gordon Campbell of San Jose, Calif.-based Chips & Technologies is encouraging his staff to use the private jet, which seats eight. "Typically, we have a lot of equipment we have to travel with that makes flying with commercial airlines difficult," said a spokesman who also uses the plane. When vacationing, Campbell prefers using his private helicopter "to fly to his ranch," the spokesman added.

After reducing its worldwide work force by 400 employees this year, Dun & Bradstreet Software claims it currently has openings on its books for 130 positions. Customer suggestions on where they should plug the gaps can be phoned to News Editor Pete Bartolik at 800-343-6474, faxed to 508-875-8931 or sent via MCI Mail to COMPUTERWORLD.

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